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SUPPLEMENT.

THE INDIAN MEDICAL YEAR, 1925.*

In presenting this review of the Indian medical year, 1925, the reviewer would like to express his most sincere and grateful thanks to the distinguished contributors who have helped to make it a symposium by several different writers, rather than a review by a single author.

DISEASES OF THE TROPICS, EPIDEMIOLOGY, SYMPTOMATOLOGY AND TREATMENT.

MALARIA.

Perhaps the most important event of the year in connection with malaria, as the gravest of all public health problems in India, was the discussion at the Conference of Medical Research Workers held at Calcutta in December. The "Central Malaria Bureau" for all-India at present consists of one small room at the Central Research Institute, Kasauli, some 180 feet square, with a staff of one officer—part-time, one sub-assistant surgeon, one peon and one sweeper. Colonel Christophers described the (imaginary) visit to this bureau of some American familiar with Rockefeller methods in the investigation and control of diseases in the tropics. His remark would probably be "Is this the 'Central Malaria Bureau' for all-India?" A resolution was unanimously passed strongly supporting Colonel Christophers' recommendations for (a) immediate and temporary measures to expand the dimensions and activities and staff of the bureau, and (b) for future provision of a fully staffed and equipped institute and bureau, commensurate with the immense needs of India; a scheme which may require sanction by the Secretary of State, and probably some addition to the cadre of the Medical Research Department.

Epidemiology.—The visit of Sir Malcolm Watson to the infected areas in the Assam tea gardens is the outstanding event of the year. We have previously dealt with Sir Malcolm Watson's wonderful work in Malaya in our columns; work with results almost equal to those achieved by the Americans in Panama, and the more remarkable in that he had not only to deal with severe epidemic malaria in the F. M. S., but—unlike the Americans—had to persuade the rubber companies concerned that the control of malaria is a paying proposition in hard cash. It can no longer be said that the great industries of India are not alive to this problem; the tea and coal mining industries for instance, have taken vigorous steps to deal with it; and the present trouble is not want of funds, but of trained investigators to carry out the much-needed surveys. Dr. C. Strickland, working on a special grant from the Indian Tea Association since 1923; has been investigating the position in general in connection with the tea industry in Assam, and his results were presented

in a paper read before the annual meeting in March, 1925, of the Assam Branch of the British Medical Association, and in a paper in our issue for November. Haphazard methods for mosquito control, he claims, are useless; the advantages of a survey are (a) to locate healthy sites for bungalows and lines; (b) to localise the area within which anti-mosquito measures should be taken, and (c) to choose the most appropriate measures for the actual problem in hand. Thus, to drain a swamp to eradicate *A. umbrosus*—an important carrier in Assam—may but mean the introduction of *A. maculatus*, which breeds in clear running streams and is an even worse carrier. The important carrying species in Assam are (a) *A. umbrosus*; found at Baliapara and probably of widespread incidence in Assam. This mosquito can be eliminated by clearing out all jungle within 300 yards' radius of lines; (b) *A. maculatus*, as incriminated in the surveys at Pasighat and Lumding, also by Malcolm Watson at Doom Dooma; (c) *A. culicifacies*, a clean water breeder, especially prevalent with the advent of the rains; and (d) *A. funestus*. Bungalows and club houses—especially—should be screened. Water tidiness in general is necessary, and is of special value against *A. maculatus* and *minimus*; oiling of pools is of value against *A. culicifacies*; whilst controlled flooding should be used more than it is. In certain places jungle growth should be encouraged in *hulas* and *hals*, after draining them, against *A. maculatus* and *umbrosus*, in other areas jungle should be cleared to get rid of other carrying species. "Save the women and children" from malaria on the tea estates, and the labour population will be contented and happy; what the women of India think to-day, the men think to-morrow. Anti-malarial measures, based upon a survey of the local problems, have succeeded in Malaya; there is no reason why measures based upon the results of similar surveys in Assam should not succeed.

The same author criticises Dr. C. A. Bentley's "Malaria and Agriculture in Bengal." Dr. Bentley claims that epidemic malaria in Bengal is due primarily to the embanking of the land, which prevents the natural flood and flush of the Gangetic delta area. Dr. Strickland considers that if there was not a single embankment in Bengal, its malarial incidence would still be much as it is at present. Dr. Bentley suggests, by way of control, "bonification"—the Italian method of controlled flooding and flushing; but Dr. Strickland considers that this will not affect *A. aconitus* and *A. funestus* (*minimus*), which are important carriers in Bengal. In general, however, he supports Dr. Bentley's policy of controlled irrigation for the malarious districts of Bengal.

Lieutenant-Colonel C. A. Gill comments on the possible rôle of *A. rossii* as a carrier of malaria. It is the commonest anopheline of India, and from July to October swarms in every portion of the rural areas in the Punjab, outnumbering all other anophelines present put together. Even if it be but a poor carrier of malaria, yet it is so prevalent that it might be responsible for much malaria. Under laboratory conditions it can be infected experimentally with *P. vivax*, and shews sporozoites in its salivary glands, whereas it failed to take with *P. falciparum*. It is an avid sucker of human blood, and—upon applying the precipitin test to the blood-meal within its mid-gut—has been found to feed by preference upon man, even in the presence of cattle. The literature upon the subject is very confused. Is it possible that *A. rossii* is a carrier in the Punjab of *P. vivax*, though not of *P. falciparum* infections?

Mr. R. Senior-White, F.R.S., records the eradication of malaria from a rubber estate in Ceylon with a total population of 357 souls. From 1914 to 1921 malaria cost the estate approximately Rs. 831 per annum in loss of working days, and the population of 357 shewed an annual average of 830 admissions to hospital for malaria. The expenditure upon prophylactic quinine was Rs. 352 per annum. In 1919

*Notes.—(1) Unless otherwise stated, the commissioned officers referred to are all officers of the Indian Medical Service. In order to save space, references to qualifications, decorations and titles have been omitted.

(2) In compiling this review some 15 journals for 1925 have been studied and all papers of importance by workers in India abstracted. The reviewer trusts that the resulting review is fairly comprehensive, but does not guarantee that it includes references to all work published by writers in India during the year. A bibliography of references would have been a desirable addition; but considerations of space forbid this.

(3) Extra copies of this review are available from Messrs. Thacker, Spink & Co., P. O. Box No. 54, Calcutta, at a cost of Re. 1 each.

a survey was carried out, and *A. maculatus* incriminated. Its breeding places were thoroughly dealt with, chiefly by oiling, at a cost of Rs. 195 per annum. The annual average number of deaths from malaria dropped from 13 to 4, with an estimated saving of Rs. 480 per annum on increased number of days' work. The example is a small one, but it is typical of results which can be multiplied almost indefinitely upon a much larger scale.

In our last annual review we commented upon the very valuable malarial survey of the Singbhum mining settlements by Colonel Christophers; this report has now been re-published in the *Indian Journal of Medical Research* for October, 1925, and will thus fortunately reach a much wider circle of readers. Colonel Christophers' survey has been continued by Captain R. C. Watts. In the Bengal Iron Co.'s settlements at Manoharpur, Chiria and Duia, *A. culicifacies* was incriminated as the most important carrier; the spleen rates being respectively, 81 per cent., 57 per cent., and 67 per cent. At Manoharpur the local ravine should be drained, a pestilential rice field cleared, and the railway excavations dealt with. At Chiria the camp site should be moved to the adjacent Buda hill, and bungalows screened; here there were 638 admissions for malaria in three months, August to October, 1923, from among a labour force of 1,441. At the Cape Copper Co.'s mines at Bakha the tank should be abolished, an adjacent rice field purchased and dealt with, and the copper sulphate discharge from the main shaft diverted up-stream in order to kill mosquito larvæ. At Chiria of 300 imported Madrassi coolies at one mine, 10 were dead from cerebral malaria within a fortnight of arrival, and the rest decamped. Throughout the enquiry *P. tenue* forms were the chief type of parasite encountered. Such commercial enterprises would do well to consult a medical or health officer before selecting sites for bungalows and lines; jungle should be cleared for at least 200 yards around camps, and any distance within quarter of a mile of rice cultivation avoided. Prophylactic quinine and mosquito brigades are also advocated.

Drs. J. Dodds Price and C. Strickland deal with the significance of the splenic index for malaria in endemic kala-azar areas. Rare pathological causes of splenic enlargement need not be considered; but kala-azar is of importance when clinical signs of the disease are well marked. Where clinical evidence of kala-azar is not marked, the degree of splenomegaly of the community may be taken as an index of malarial incidence. Should clinically evident kala-azar be present, splenic indices should be controlled by observations of the endemic (parasitic) malarial index.

Dr. D. A. Turkhud, writing from the King Institute of Preventive Medicine, Guindy, Madras, notes that malarial surveys were carried out during the year by the mobile epidemic units attached to the Institute in the districts of Ennore, Vayalur, Mettur, Vizagapatam and Simhachellam. Ennore was found to be a hyper-endemic focus, whence the infection travelled to other areas. *A. culicifacies* and *A. fuliginosus* were the chief carriers. Work in connection with the Mettur and Vizagapatam areas is still in progress, this work being of extreme importance in view of the official decision to create a new, large harbour for ocean-going vessels at the latter port. The area is intensely malarious, the chief anopheline carriers being *A. culicifacies*, *fuliginosus*, *stephensi*, *barbirostris*, and *minimus*. Spleen rates vary from 50 to 85 per cent., and parasite rates from 60 to 93 per cent. Simhachellam is a small hill station in the area which is a pilgrim centre; the spleen rate is from 70 to 85 per cent. and *A. fuliginosus* is the chief carrier. Recommendations are being made to deal with each area concerned.

It will be seen that, although—as Colonel Cunningham complained at the Medical Research Workers' Conference in Calcutta in December—at the 1925 conference of different nations at Rome on malarial problems and epidemiology, no reference was made to the work of

workers in India, yet the malarial problems of India are not without attention. The reproach that India has made less use of Sir Ronald Ross' great discovery than any other country is not deserved; it is all a question of men and money.

Clinical.—Numerous papers on the clinical aspects of malaria have appeared during the year in India. The very complete discussion on the use of the different alkaloids of cinchona febrifuge at the January, 1925 meeting of the Royal Society of Tropical Medicine and Hygiene, by Colonel Clayton Lane and Colonel Gage, amongst others, has already been fully reviewed in our issue for last January, p. 30.

R. B. Lal discusses the relative proportion of male and female crescents in malignant tertian infections; from September 25th to December 17th, in a series of continuously observed cases, the proportion was about equal. During the subsequent winter months, however, the proportion of female crescents appeared to decline steadily.

In the treatment of malaria, K. V. Raju describes the value of Sinton's combined alkali plus quinine method. The method is more suitable for in-patients than for out-patients. The mixtures are well tolerated: patients once treated have not returned to hospital with relapses; and after the administration of from 20 to 40 grains of quinine by this method the patients are almost always afebrile. K. Majumdar records the case of a child of 5, with a temperature of 106°F., stoppage of respiration and apparent death. Plunging into a cold tub, artificial respiration, and a daily dose of 5 grains of quinine bishydrochloride intramuscularly brought about recovery. N. Ghosh records a case of cerebral malaria with sudden onset, convulsions and a sub-normal temperature. Intravenous administration of quinine bishydrochloride in 8 gr. doses with $\frac{1}{2}$ c.c. doses of pituitrin saved life. K. N. Chatterji records a case of a young boy almost pulseless on the fifth day of fever, with vomiting, purging and hemorrhagic stools with agonising abdominal pain. Quinine bishydrochloride, gr. 5 in 10 c.c. of saline was given intravenously plus an injection of 10 m. of adrenalin solution, and repeated next day. The patient made a complete recovery. V. N. Deuskar comments on an unusual case with severe recurrent urticaria and very severe abdominal colic at times of rigor as the chief symptoms. J. Dhairyam deals with the treatment of malaria in pregnancy. The treatment advocated is (a) a preliminary purge of calomel or castor oil; (b) half an hour later 10 grs. of quinine acid hydrochloride intramuscularly with 10 grs. of potassium bromide by the mouth; (c) half an hour later repeat the same dose of potassium bromide. This course of treatment is repeated on the next day; and from the third day onwards 10-gr. doses of quinine are given by the mouth, followed by 7-gr. doses of potassium bromide, both t.d.s. Dr. T. H. Bishop describes the value of routine cinchona febrifuge mixture as a prophylactic on the E. B. Railway.

Of drugs other than quinine, Dr. A. Neave Kingsbury and K. Kanagarayer have tested "mercurochrome, 220," a 5 per cent. solution given intravenously in 20 c.c. doses; they found it quite useless both in benign tertian and malignant tertian infections, and its use attended with such unpleasant sequelæ as stomatitis. Dr. W. Fletcher of the Kuala Lumpur Institute has tested "Peracrina, 303." He considers that it appears to consist of yeast cells plus a little starch and a yellow dye—presumably acriflavine. It proved impracticable to administer it for a long period and in the large doses recommended by the makers. It is far too expensive for general use—a single full course of treatment costing about £2-16-0. It appeared to have no effect whatever upon the malarial parasites upon trial in 18 patients, duly controlled by blood examinations. In some instances its administration was attended by such severe exacerbation of the malaria that it had to be suspended and quinine given in its place.

In connection with *blackwater fever*, Dr. U. N. Brahmachari and P. B. Sen record an investigation into the mechanism of quinine hæmoglobinæmia in man. The history is given of a patient who suffered from hæmoglobinuria one to two hours after each of four doses, of 5 grains of quinine. No malarial parasites could be detected upon repeated examination of thick and thin blood films. The patient's red blood corpuscles were *not* more fragile than normal, nor was his serum hæmolytic to normal erythrocytes. No hæmolysin could be demonstrated in his serum after quinine administration. The patient was suffering from kala-azar also; this was cured by urea stibamine, but cure of the kala-azar did not affect the spontaneous tendency to hæmoglobinuria on quinine administration.

Apart from true malaria, Captain W. C. Spackman draws attention to the occurrence of Gaucher's type of splenomegaly in the Mahratta village of Dhagur, near Nasik. The village used to have a population of 400 souls; it is now deserted by reason of a curious epidemic outbreak of splenomegaly, which caused 12 cases in 3 families, and shewed a very marked familial incidence. It was confined to the Mahrattas, the Kolis and Chamars living in the same village being unaffected. In one patient, aged 16, splenectomy was resorted to with apparent recovery. Lieutenant-Colonel F. P. Mackie reports on this spleen that no *Leishmania* parasites could be found, and sections shewed great reduction of the lymphoid tissue of the spleen with endothelial overgrowth; thus corresponding to Gaucher's type of splenomegaly. J. N. Sen records an interesting case of enlarged and wandering spleen mistaken for ovarian tumour, with splenectomy and recovery; the removed spleen was malarial and weighed 4 lbs. 12 ozs.

PLAGUE.

Major W. D. H. Stevenson and Khan Bahadur R. J. Kapadia shew that there is complete absence of the usual phenomenon of a negative phase in immunity after inoculation with Haffkine's vaccine. Production of immunity in inoculated rats commences within a few hours of inoculation and increases in amount till the second or third day; after 14 days a considerable degree of immunity is still present in these rats. Captain R. H. Malone, Khan Bahadur C. R. Avari and B. P. B. Naidu have studied the bactericidal power of rats' blood as a measure of their immunity to plague, and shew that a definite correlation exists. Two per cent. of natural Madras rats, 33 per cent. of Bombay rats, and 97 per cent. of immunised Madras rats were found to be insusceptible to infection; tissue-immunity is probably a factor in producing these results; and it may be possible to assess the immunity in man by tests of the bactericidal power of the blood. More light is needed upon the mechanism of natural and acquired immunity to plague.

Dr. J. Balfour Kirk from Mauritius records a fatal case of bubonic plague with a small-pox like rash. From the sixth day of illness onwards a discrete papular rash appeared in successive crops on the face, neck, arms, buttocks and thighs; it became maculopustular and then pustular. There was no itching. Pus collected from two of the pustules under full aseptic precautions yielded cultures of *B. pestis*. The patient died on the 19th day of illness.

By way of prophylaxis, the studies in 1925 by R. B. Lal and C. D. Tiwari of methods of disinfection deserve attention. Cresol fumigation as ordinarily carried out has no action on rats, but has a definite action on rat fleas, household furniture and rat runs affording protection to the rats against the fumes. The toxic action of cresol vapour tends to be more manifest at higher levels within the room. In actual use therefore all furniture, etc., should be removed from the room before cresol is used. At least 10 ozs. of cresol should be used per 1,000 cubic feet of space. The drug is best distributed over two pans containing smouldering cow-dung; the room should be carefully

sealed before fumigation, the floor subsequently washed with phenyl, and rat runs subsequently dealt with by *neem battis*. The same authors deal with fumigation with *neem battis*, and find that this measure will kill rats and their fleas in burrows in the fields in five minutes, if the burrows be closed. The preparation of *neem battis* is as follows:—Potassium chlorate 2 drs.; potassium nitrate 1½ drs., and powdered sulphur are mixed together and mixed with 5 drs. of mustard or castor oil to form a paste. One drm. of chilli powder (red pepper) is added and a handful of dried *neem* leaves. Nine inch wicks of khadder cloth are taken and soaked in saturated potassium chlorate solution; the prepared paste is then spread thickly over the wicks, leaving the terminal inch free for lighting; and they are then finally wrapped in cloth and thick paper. The rat runs are closed at all entries and exits with one exception, a prepared *neem batti* lighted and inserted, and the final aperture then closed. The method will completely rid a given area of rats.

CHOLERA.

Epidemiology.—Perhaps the chief paper of the year is that by Lieutenant-Colonel A. B. Fry in our issue for July. The Public Health Committee of the League of Nations having put forward certain questions to India for answer, Colonel Fry attempts to answer them. Thus it must be admitted that India is still the endemic focus of epidemic cholera for the whole world, and that deltaic Bengal is still its endemic home in India where endemic cholera still occurs as regularly and as severely as ever. There is considerable evidence to shew that cholera in the rest of India is dependent upon the chronic cholera focus in Bengal; in the records of the nineteenth century it is easy to trace the spread of wave after wave of epidemic cholera from Bengal over India, and even as far as the banks of the Mississippi, but in the twentieth century the increased facilities for railway and rapid travel rather obscure the records. Why deltaic Bengal should thus constitute the endemic focus of cholera for the whole world deserves investigation; climatic, humidity, temperature and other factors affecting the viability of the vibrio are probably concerned. A concentrated attack upon this age-old focus for the whole world might be attended with the maximum of results; in the meantime stringent quarantine at ports and frontiers is obviously necessary. That deltaic Bengal is the chief cholera focus for the whole world is probable; what we propose to do about it is less evident, but the problem is not being neglected by the Indian Research Fund Association.

Major A. J. H. Russell has made an extensive study of the incidence of epidemic cholera in Madras Presidency, assisted by a grant from the Indian Research Fund Association. His results are reported both in the *Lancet* and elsewhere. Cholera in Madras Presidency—also in Bombay, the Punjab, United Provinces, and Central Provinces, when studied over the period 1896-1923 shews a remarkable six-year cycle of maximal periodicity. Colonel W. G. King (retd.) in a letter to the *Lancet* points out that he drew attention to this as long ago as 1894, and described a "Madras cholera clock." Importation into Madras in any period other than that following the chief monsoon period is not dangerous; the epidemic fizzles out. Colonel King's cholera clock has now kept good time for over 25 years. In Madras the endemic foci are found in the riverine and deltaic areas. In the northern area epidemic cholera sets in with the onset of the S. W. monsoon; in the southern area it breaks out six weeks to two months after the onset of the N. E. monsoon. The central areas shew two cholera peaks of incidence, roughly coinciding with the two chief peaks of rainfall. An annual periodic curve is shewn by Major Russell, together with a super-imposed more or less regular six-year cycle. He comments upon the great value of such fore-knowledge of the

periodicity of epidemic cholera in taking measures beforehand to control cholera epidemics.

Diagnosis.—Working in the Jheria coal-fields, Captain G. C. Maitra draws attention to the co-existence of two different conditions: (a) a cholera-like disease of indefinite aetiology, low infectivity and non-epidemicity; and (b) true cholera, introduced from the pilgrim centres at Puri and Baidyanath, and due to Koch's vibrio. Only competent bacteriological examination will differentiate between the two, and in the case of the former elaborate anti-cholera measures are not called for. The value of oral vaccination by Besredka's method is on trial. The examination of the cellular content of the stools microscopically in suspected cholera is of value in diagnosis. In 495 cases comma-like vibrios were found in 84 per cent.; 92 per cent. shewed evidence of concentration of the blood; whilst abundant presence of desquamated epithelial cells in the dejecta together with relative absence of polymorphonuclear leucocytes—in contra-distinction to what one finds in acute bacillary dysentery—is the rule. A cytological diagnosis can be returned in some 90 per cent. of cases. The same author, with J. B. Basu, has also studied 746 clinical cases of cholera admitted to the cholera wards of the Campbell Hospital, Calcutta. Here they find a complete contrast to conditions in the coal-fields. Over 90 per cent. of cases shewed true cholera vibrios or allied vibrios; which were present in 590 of the patients examined. No cholera-like outbreak of indeterminate aetiology was noticed.

Treatment.—Lieutenant-Colonel F. J. Palmer, R.A.M.C. (retd.), advocates the use of cresol. For an adult his formula is:—cresol m. 4; acidi sulphurici aromatici m. 5; water to 4 ozs.; as one dose; graduated for younger patients according to age. Of this 8 doses are given every quarter of an hour at first; then 4 doses at half-hourly intervals; then omit the acid and continue at 1 hourly intervals for 12 doses; finally at 2 and 3 hourly intervals. Nine cases treated are recorded, 8 of them in the collapse stage, with 7 recoveries. L. B. Ganguli records the trial of this treatment at the Campbell Hospital, Calcutta, from January to May, 1925, during the epidemic season. Group (a) of patients received calomel in fractional doses, with intravenous salines and alkalis. Group (b) received the cresol treatment, in the form of 'Izal' with intravenous saline but no alkalis. The total number treated was 513; divided into two groups of approximately equal numbers. The mortality in the two groups proved about identical, but in some of the Izal patients, the Izal treatment had to be suspended on account of threatened uræmia, and it is pointed out that these cresol derivatives are renal irritants. The standard rate of recovery at the Campbell Hospital under treatment by hypertonic salines and alkalis is about 80 per cent.

DYSENTERY AND AMOEBIASIS.

At the annual meeting of the Assam Branch of the British Medical Association, Dr. G. C. Ramsay drew attention to the exceedingly unsatisfactory state of affairs with regard to anti-dysenteric serum in India. Some five-sixths or more of the dysentery of India is bacillary in character and the specific or polyvalent serum is the best remedy. "It is inconceivable at this stage of civilization in India that all our anti-serum is imported from Great Britain, America, France and Japan. When we obtain our supplies from Shillong or Kasauli we are well aware that they have been kept in cold storage, but it would be instructive to know if these requirements are duly carried out by retail chemists in India. Perhaps this may explain the inertness of many samples." This is a problem to which we have often reverted in our columns; surely it should not be beyond the capacity of one of the many large vaccine and serum institutes in India to work out local strains, manufacture locally-made serum, and place satisfactory supplies at the disposal of the profession in India.

Captain G. R. McRobert deals with the abuse of emetine. The practice of "in diarrhoea try the effect of emetine," and "try emetine for all patients with liver disturbance" leads to disastrous results. Emetine is especially abused in military practice in this country. The treatment of every case of dysentery should be based upon an accurate microscopical diagnosis of the type of dysentery present; and in this connection the use of warmed cigarette tins, surrounded by a hot-water jacket, in which to send faecal samples to the laboratory is advocated. He has known patients undergoing courses of emetine treatment even to be permitted to enter as competitors for athletic events; it is no wonder that they "felt like death." Post-emetine toxæmia is not an infrequent sequel of bacillary dysentery in this country. Emetine is far too valuable a drug to be misused; in its right place it is incomparable.

Dr. D. A. Turkhud, Director of the King Institute of Preventive Medicine, Guindy, Madras, reports on an enquiry made at the Madras Penitentiary on the increasing admission rate for dysentery amongst the prisoners. Colonel Cunningham's method of daily macroscopic inspection of the stools of all convicts for ten days was carried out. Out of 903 convicts in the penitentiary, the stools of 700 were daily examined and 172 of these were separated as latent dysentery carriers and placed in a separate gang. Bacteriological examination of these cases detected 15 active carriers of *B. dysenteriae*—Flexner, Shiga and Morgan strains all being isolated. In addition there were 12 cases of *E. histolytica* infection. Ten convicts out of 26 employed in the kitchen were found to be dysentery carriers. The appropriate measures were taken and it is proposed to repeat such special examinations every six months in order to control the outbreaks.

An interesting paper by Assistant Surgeon B. M. Das Gupta deals with the vexed question of the identity or otherwise of *E. nuttalli* of the monkey with *E. histolytica* of man. A *Macacus rhesus* monkey was found dying of spontaneous dysentery and its stools shewed sluggishly motile entamoeba. These were cultured by Boeck and Drbohlav's technique, and grew well in culture. In culture the parasites were morphologically identical with *E. histolytica* and shewed ingested red blood corpuscles; but on injection into kittens no dysentery resulted. The same author has now repeatedly grown *E. histolytica* of man by the same technique, and it seems highly probable that in a year or two the test for protozoal infections of the intestine will be by cultural methods rather than by direct microscopical examination of the stools.

Lieutenant J. P. Arland records a case of liver abscess which proved fatal at operation. Two-thirds of the liver tissue was found to be destroyed and two pints of pus were evacuated from the liver. Death on the operation table was apparently due to the sudden relief of pressure on the inferior vena cava setting up a suction action on the heart. At post-mortem the heart and great vessels were found almost empty of blood. (In the reviewer's opinion, the only indication for open operation in the case of amœbic abscess of the liver is the presence of secondary sepsis or of urgent pressure symptoms; emetine plus aspiration is the standard line of treatment to-day, and one can scarcely ask for any better line of treatment; even the aspiration can often be dispensed with.) In connection with liver necrosis, Y. S. Row records the occurrence in four years in Alipuram jail of three cases of what was apparently acute yellow atrophy of the liver, without apparent cause, the aetiology of which was obscure.

ENTERIC FEVER.

Dr. W. Fletcher and J. E. Lesslar record an interesting case of typhoid septicaemia without typhoid ulcers in an old Chinaman in Kuala Lumpur. The patient died six weeks after the onset of illness. Two strains of *B. typhosus*, the one smooth and agglutinable, the

other rough and non-agglutinable, were isolated from his blood during life; the Flexner dysentery bacillus was isolated from his stools on each of the four occasions on which they were examined; at post-mortem *B. typhosus* was again isolated, this time from the gall-bladder; but there was no ulceration of the small intestine, only two old pigmented scars just above the ileocaecal valve. The patient may have been a chronic typhoid carrier suffering from bacillary dysentery.

A. B. de Castro records parotid abscess and fatal abscess of the spleen as sequelae of typhoid fever in two patients, whilst A. T. Roy describes the case of a Hindu girl of 12 who shewed extraordinary and persistent choreiform symptoms at the end of the third week of an attack of typhoid fever; these were associated with extreme constipation and a family history of nervous instability.

KALA-AZAR.

Dr. L. E. Napier, Kala-azar Research Worker, Calcutta School of Tropical Medicine, reviews the year as follows:—

"The kala-azar transmission problem. The most important work in connection with the kala-azar transmission problem is that carried out by the Kala-azar Commission and the Kala-azar Enquiry at the Calcutta School of Tropical Medicine.

At the end of 1924, Major R. Knowles, L. E. Napier and R. A. O. Smith first shewed that *L. donovani*, the causative organism of kala-azar, passes into its flagellate stage in the gut of the sandfly, *P. argentipes*, under suitable conditions of atmospheric temperature and humidity; out of 56 laboratory-bred flies fed on the blood of kala-azar cases 25 were shewn on dissection to contain flagellates, but 46 other flies similarly fed on patients not suffering from kala-azar did not shew any flagellates. In a subsequent paper Napier and Smith gave their experience of the development of the flagellates in the gut of the fly at different periods of the year; out of 674 fed flies dissected, 100 shewed flagellates in the 3rd to 5th days. Their investigation suggested that most of, but not all, the parasites ingested by the sandfly developed into flagellates. In parallel feeding experiments carried out with *P. papatasi*, no development was observed to take place. Attempts made by them to infect the second generation of flies by feeding the larvæ on infected adult flies apparently failed; 24 larvæ and 132 adult flies thus fed were dissected but no recognisable forms of *Leishmania* were observed.

In the study of the bionomics of the sandfly, *P. argentipes*, Napier and Smith report that this fly is to be found in Calcutta and the surrounding rural areas throughout the whole year; the numbers are observed to decrease during the cold weather months, December and January, and the driest months, April and May; the flies were caught in the ground-floor rooms of houses and huts but the largest numbers were observed in unpaved cowsheds. Large numbers of flies were caught during the period covered by this paper and were placed in breeding cages; from these 8,794 flies were bred out by the method devised by Dr. Smith and reported during the year.

In a serological investigation of the blood-meal of *P. argentipes*, Major R. B. Lloyd and Drs. Napier and Smith shewed that this sandfly feeds on the cow in preference to man, but on man in preference to other domestic animals, that therefore the presence of a cow protects man from the bite of the sandfly and that the cow might thus possibly play a part in the prophylaxis against kala-azar.

The Kala-azar Commission, consisting of Lieutenant-Colonel S. R. Christophers, Major H. E. Shortt and P. J. Barraud, has published a large number of papers during the year and has also contributed a number to the Kala-azar Memoir of the *Indian Journal of Medical Research* which was due to be published during the year. The memoir has not yet appeared, but with

the kind permission of the editor of that journal reference is here made to some of the most important points brought out by the papers appearing in this memoir.*

In the first place these workers were able to confirm the findings of Knowles, Napier and Smith, which were reported last year, on the development of the parasite of Indian kala-azar in the sandfly, *P. argentipes*. Seventeen wild flies fed on kala-azar cases were dissected and 5 were found to contain active herpetomonas-like flagellates; a number of wild flies which had not fed on patients were dissected but no other controls were carried out. In a second paper they reported the finding of flagellates in the gut of 14 flies out of 53 fed, most of the flies being laboratory-bred, and in a third paper on controls they reported negative findings in 116 flies fed on the blood of healthy persons at various periods of the year. In their second paper they stated that in no instance did they observe flagellates anterior to the proventricular fold but in a footnote, probably referring to observations at a later and more favourable period of the year, they stated that they had observed flagellates in the oesophagus. In yet another paper on these sandfly feeding experiments they observed that the female flies could be induced to feed a second time if they were segregated from the males immediately after emergence; out of 17 flies fed a second time, 4 were observed to contain flagellates. Summarising their observations up to the date of publication of this paper, they reported 222 dissections of flies fed on kala-azar cases with 52 positive findings. Finally, the Kala-azar Commission have been able to shew by cutting sections of the fed flies that on the fifth day the pharynx was infected in 6 out of 14 specimens, and that in the case of 2 flies which had taken a second blood-meal and were dissected on the seventh and eighth days respectively, there was a heavy infection of the buccal cavity.

The Kala-azar Commission reported negative findings in 22 flies fed on N.N.N. cultures of *L. donovani*, and also published a paper dealing with the technique they employed in breeding sandflies. After a re-examination of the slides of a flagellate found by Mackie in sandflies in Assam in 1914, Shortt concludes that the flagellate was a Bodo and not a *Herpetomonas*.

In a very careful study of the life history of the parasite of Indian kala-azar Christophers, Shortt and Barraud shewed that it went through a definite cycle of development; parasites of the same stage of development always appearing in cultures of the same age, the post-flagellate stage being reached about the eighth day. In other papers they shewed that the optimum temperature for development of the parasite in N.N.N. medium was about 28°C., that the range of development was from 16°C. to 34°C., and that the flagellate was fairly resistant to changes in osmotic pressure but did not withstand the action of water.

A number of animal infection experiments were carried out by the members of the Kala-azar Commission. Attempts were made to infect mice with flagellate cultures of *L. donovani* by feeding and by intraperitoneal inoculation. They failed to infect any mice by feeding them with culture material, but infected about 90 per cent. when cultures of more than 7 days of age were injected into the peritoneal cavity, although injection of younger cultures did not produce infection. It would thus appear that the parasite does not reach the infective stage until the seventh or eighth day. Attempts were made to infect monkeys directly or indirectly by means of bed-bugs fed

* This special memoir is now in press and will shortly be published. It contains some 30 papers describing all recent work upon the kala-azar transmission problem in India. Messrs. Thacker, Spink & Co., Calcutta, are the publishers. R. K.

on kala-azar patients with entirely negative results. Two other experiments on monkeys were reported, in which a systematic infection was produced by intradermal injection of infected spleen juice in one case and in another in which this material was introduced directly into the lumen of the gut.

P. J. Barraud of the Kala-azar Commission carried out a limited survey of the town of Madras during the month of July. He found *P. argentipes*, *P. minutus*, *P. squamipennis* and *P. papatasi*. The three first-named varieties have been previously recorded in Madras but not so the last-named. *P. argentipes* was discovered in practically every quarter of the town, but the largest numbers were observed in George Town which is the quarter most heavily infected with kala-azar. A more detailed survey was carried out in two streets; the kala-azar infected street was found to be heavily infested with *P. argentipes*, whilst in the other in which few, if any, cases of kala-azar had occurred there were very few *P. argentipes*.

An epidemiological study of the disease was made by Napier; all the aspects in the epidemiology of the disease, geographical distribution, seasonal incidence and so forth, were considered in relation to the various means by which the disease might possibly be transmitted. It was concluded that there was considerable evidence that the disease was not transmitted by direct means and that if it were transmitted by an insect there was considerable evidence in favour of the sandfly, *P. argentipes*. Two notes on the incidence of kala-azar on the Pusa Estate and in the surrounding districts were contributed by D. P. Michael; notes on kala-azar in the Ramnad district by T. S. Balasubramanian and on a new endemic focus at Kayalpatnam by Lieutenant-Colonel J. Cunningham and S. R. Pundit were contributed. The latter place is in the Madras Presidency about 50 miles from Cape Comorin; 56 cases were reported, mostly amongst Mohammedans. It is an interesting point that the Hindu community living alongside were practically unaffected. A report on a study of the environment associated with kala-azar incidence in Calcutta which was carried out in 1924 by Napier was published during the year. He noted that certain quarters in the city were practically free from the disease, whereas others were heavily infected. The importance of these observations was that they led to the undertaking of an entomological survey in Calcutta which in its turn led to the above-reported experiments with the sandfly, *P. argentipes*, being undertaken. The Kala-azar Commission and the Enquiry at the Calcutta School of Tropical Medicine investigated the *Culicoides* of Assam and Calcutta respectively; 4 varieties were reported by the former and 8 by the latter. The Kala-azar Commission reported that 193 specimens of *C. macrastoma*, the only variety observed to bite man, were fed on the peripheral blood of kala-azar cases but that on dissection on the third day none of these were found to contain flagellates.

Kala-azar Treatment. It is quite obvious that the pentavalent antimony compounds have come to stay and that the only excuse for adhering to the antimony tartrates is that they are many times cheaper than any of the pentavalent compounds at present available. Stibosan, the proprietary name adopted for von Heyden "471," has been obtainable throughout the year and has been extensively used in the treatment of kala-azar. Lieutenant-Colonel E. D. W. Greig and S. Kundu used the compound in the treatment of 14 cases and concluded that the mean sterilizing dose was a total of 2 grammes and the absolute sterilizing dose a total of 3.49 grammes; but in another very resistant case they reported that 5.6 grammes had failed to produce a cure. Napier, who has been using this compound for some time, contributed a short note on the question of dosage; he advocated the giving of injections three times weekly, giving an initial dose of 0.2 gramme and a maximum dose of 0.3 gramme for an adult and suggested that a total

dose of 3 grammes per 100 lbs. body weight was usually necessary to cure an ordinary case of kala-azar. K. N. Chatterjee contributed a paper on Stibosan in private practice, reporting good results after a very short course of injections. Lieutenant-Colonel Greig and S. Kundu treated 51 cases with urea stibamine and found the mean sterilizing dose to be 2.12 grammes and the absolute sterilizing dose (excluding one resistant case) to be 4.2 grammes. They reported a resistant case that had received 2 grammes of potassium antimony tartrate and 10.6 grammes of urea stibamine without being cured. Dr. U. N. Brahmachari collected reports of 27 cases of kala-azar cured with urea stibamine in from 32 hours to 7 days. He suggested an intensive course of treatment by giving a number of injections on the same day; he reported that he had done this without untoward symptoms. Major N. C. Kapur reported the results of treatment of 50 cases treated at the out-patient department of the Medical College. The series were controlled by blood cultures taken before and after treatment by Dr. Brahmachari himself. A remarkable point about this investigation was that the blood culture before treatment was in every case positive; an unusually consistent finding in view of the fact that many of the cases had already undergone treatment. All the cases recovered rapidly. In another paper Dr. Brahmachari and B. B. Maity reported a series of cases in which the diagnosis had been made by blood culture in 97 per cent. of cases and by spleen puncture in only 84.5 per cent. He also reported that the blood had become sterilized in 26 out of 37 cases within 12 days by the use of urea stibamine. S. Kundu reported a case in which he had administered urea stibamine intramuscularly without causing much pain, and another case in which an antimony rash had followed the administration of urea stibamine. Dr. Brahmachari published further details about the preparation of urea stibamine and also gave details of the preparation of two new pentavalent compounds. Stibamine glucoside, a compound prepared by the Wellcome Research Laboratories, was first used in the treatment of kala-azar by Napier; he reported the result of treatment with this compound in 10 cases. He found this compound far superior to sodium antimony tartrate and comparable to Stibosan and urea stibamine in its action. Cases were cured in less than one month. Subsequently, Greig and Kundu reported two cases which had been cured by this compound. Another new compound was also introduced by Napier as "Aminostiburea"; he reported very good results with this compound, which he considered compared very favourably with any of the pentavalent compounds so far used. B. Mozumdar reported on the treatment of 202 cases of kala-azar at the Campbell Hospital, Calcutta; most of these cases were treated with sodium antimony tartrate.

Greig and Kundu reported that as a general rule the blood-sugar in kala-azar was low. They however reported one case in which the blood-sugar was very high, 0.461 per cent.; this patient, aged 17, was passing as much as 38.4 grs. of sugar in an ounce of urine. Both conditions were apparently cured by urea stibamine and insulin.

Other forms of Leishmaniasis.—During the year Lieutenant-Colonel R. Row described a case of canine leishmaniasis that he had seen in Bombay. The parasites were found in ulcers on the ears, nose and lips of the dog, but there was apparently no general infection. Shortt and Brahmachari contributed a paper on the histopathology of dermal leishmanoid; the primitive cells of the cutis vera were heavily infiltrated, the epidermis was thin, but there was no sign of ulceration, and the cutis vera was markedly thickened.

MEDICAL HELMINTHOLOGY.

This branch of tropical medicine is such an important one that it may be best considered under three differen

headings:—(1) ankylostomiasis; (2) other helminthic infections; and (3) anthelmintics.

Ankylostomiasis. A detailed investigation has been made by Dr. A. C. Chandler of hookworm epidemiology on a tea estate at Moheema in Upper Assam. The infection rate was found to be 93.6 per cent., the average eggs per gram of faeces 1,070, and the index of infection ($\sqrt{\frac{\text{epg}}{100} \times \%^2}$) 317, or about three times that of rural Bengal. Soil pollution in the group studied was universal, definite defecation sites being habitually used; the sites selected were protected places usually about 50 to 75 yards from the habitations. There was also some scattered pollution in the tea itself, which probably accounts for the slightly higher rate of infection among the women than the men. Soil infestation with hookworm larvae was practically limited to the defecation sites, and it is quite evident that most of the infection occurs while standing on infested ground during defecation. Climatic conditions practically limit acquisition of infection to 7 months of the year, from mid-March to mid-October. A layer of thatch a few inches thick effectively prevents contact of feet with larvae, and when stools are passed in deep trenches or pits, surface infestation is almost entirely eliminated. If the coolies could be taught to defecate into the drainage ditches in the tea estate instead of on to the ground surface, infection in the tea would be practically done away with. *Ascaris* and *Trichuris* infections are present in 90 per cent. to 95 per cent. of the coolies, and were traced to the drinking of *hula* water, into which worm eggs are washed from stools deposited on the banks.

Mr. Senior-White has studied the influence of latrine installation on hookworm infection on Ceylon tea estates. These latrines are deep pits, with simple superstructure, dug in hard soil. When water seeps into them they become very serious mosquito breeding places. In the drier pits great numbers of fly larvae can be seen in the faecal masses but, apparently due to the absence of drier ground for pupation, no adults develop. Seven years after provision of latrines, thanks to constant vigilance, soil pollution is practically absent. Before the latrines were installed 98 per cent. to 99 per cent. of the coolies were found infected by the simple smear method of examination, whereas six years afterwards only 77 per cent. were found infected by Lane's D. C. F. method, and most of these were clearly very light infections, which would probably have been found negative by the simple smear method. After two further treatments the incidence was reduced to 69 per cent. and 46 per cent., residual infections being very light. Attention is called to the peculiar circumstance that as the hookworm infections were reduced by treatment with carbon tetrachloride, *Ascaris* infections increased.

Dr. V. T. Korke has made some observations on the life history and morphology of hookworms in nature, and has investigated the types of ground which are favourable and unfavourable for development of hookworm larvae; his experiments lead him to believe that unshaded ground covered by grass and vegetation is most favourable. In lieu of preventing ground pollution, which is often impracticable in India he thinks that something can be accomplished by urging the selection of defecation sites on ground found to be unsuitable for larval development. Even when development occurs the larvae frequently have a starved appearance; this was often observed in growths of long duration. Morphological distinctions between the larvae of *Necator* and *Ankylostoma* were found in the absence of a basal expansion of the buccal cavity in the rhabditiform larvae of the former, and also in the more anterior position of the genital primordium in infective *Necator* larvae.

Dr. Chandler has performed experiments in field and laboratory work which show that lateral migration of hookworm larvae does not occur, although larvae are easily distributed by a sprinkling of water. While

larvae climb vertically through coarse or sandy soil, impelled by a negative geotropism, migration on a soil wall, such as the side of a pit or ditch, is practically negligible. Experiments on the survival of healthy infective larvae on soils of different hydrogen ion concentration showed that their longevity on soil with pH 5.5 to 6 is as long or longer than that on neutral or slightly alkaline soil. A few larvae survived, during the hottest weather in Calcutta, for about three months. A comparison of different methods of discovering hookworm eggs and for measuring egg output made by Dr. Chandler shows Lane's D. C. F. method to be the best for diagnosis, and a modification of Stoll's method best for estimation of egg output. Using the D. C. F. method pushed to finality as a control, Stoll's method, with the modifications recommended, indicates the number of eggs per gram of faeces with remarkable accuracy. Dr. Chandler has pointed out that measurements of the degree of infection as well as of incidence are necessary to arrive at a fair estimate of the importance of hookworm in a community. He believes that a fairly accurate estimate of the degree of infection can be arrived at by ascertaining the average egg output per gram of faeces for the group, even though in individuals there is no close correlation between egg output and worms harboured, and the egg output varies considerably from day to day. To find a true index of infection it is necessary to take into consideration both incidence and degree of infection, and Chandler shows that a very fair relative index can be obtained by using the equation $\sqrt{\frac{\text{epg}}{100} \times \%^2} = \text{index}$, where epg represents

the eggs per gram of the infected individuals, and per cent. the incidence of infection. By this method the index of infection among coolies on an Assam tea estate works out at 317, whereas in jute mill coolies and rural inhabitants of Bengal it works out at a little over 100, or less than 100. In untreated groups in Porto Rico the index of infection is from 408 to 630.

Dr. Sweet in Ceylon has made observations on hookworm reinfections. Analysis of 8,239 egg counts showed that previously treated persons have a considerably lower infection intensity than untreated ones, especially in children. Reinfection was most rapid in the first three years after treatment, after which the intensity rates remained about the same up to the seventh year, and then began to rise. The percentages of persons found infected showed an initial sharp rise followed by a small steady increase. Dr. Sweet suggests 3 to 5 years as the probable average length of life of adult worms.

Other Helminthic Infections.—J. N. Maitra describes a very interesting case of an Indian male adult who died of jaundice. At post-mortem numerous ascarids were found and some of them had invaded the liver; two were imbedded in a necrotic area in the liver, one was in a bile passage, and three were in the gall bladder, which was firmly adherent to the duodenum. The contiguous walls of the duodenum and gall bladder had been perforated by ascarids as shown by the inflammatory adhesions.

Little further work has been done on filariasis. Dr. G. C. Ramsay has drawn attention to the scarcity of human infection in Assam in spite of the prevalence of *Culex fatigans*. Only two of 400 persons whose blood was examined at night were found infected, one of these being an Indian doctor with mild chyluria. Equine filariasis, on the other hand, is common in Cachar. The micro-filariae in horses are diurnal, and tabanids are suggested as probable vectors. *Dirofilaria immitis* is the commonest cause of sudden death among dogs in Assam.

N. Banerji recommends treatment of human filariasis by repeated doses of typhoid vaccine—20, 50, 100, 500 and 1,000 million every third day.

Dr. Chandler has studied the helminthic infections of Calcutta cats, and the extent to which cats might

serve as reservoirs for human helminths. Twelve species of parasitic worms were found, of which *Opisthorchis felinus* (61 per cent.), *Taniaformis* (42 per cent.), *Dipylidium caninum* (43 per cent.) *Belascaris mystax* (63 per cent.), and *Ankylostoma braziliense* (70 per cent.), were most common. Two new species, *Spirocerca felinus* and *Centrorhynchus erraticus*, and one new variety, *Strongyloides stercoralis felis*, were discovered, and an emended description of *Dipylidobothrium decipiens* was given. The occurrence of *Strongyloides* in 20 per cent. of the cats was of particular interest since *Strongyloides* had never before been recorded from cats in any part of the world. *Ankylostoma braziliense* was the only species of hookworm found in the cats, although in dogs it is commonly accompanied by *A. caninum*. *Gnathostoma spinigerum* was found to have a seasonal occurrence, adults having been found in over 31 per cent. of cats from August to November, and in none from November to February. Larvæ burrowing in the liver were found in 12 per cent. of the cats between January and March. Some interesting observations on the life history of this deadly parasite are the subject of a separate paper. Encysted larvæ are very common in snakes, but it is believed that the snake is an accidental host and becomes infected by swallowing the true intermediate host, probably an insect or mollusc.

The species of *Strongyloides* has been the subject of a study by Dr. Chandler. The described species fall into two distinct groups, a *S. papillosus* group parasitic in herbivorous animals, in which the tail of the parasitic form is bluntly rounded, and the eggs commonly hatch after leaving the host's body; and a *S. stercoralis* group parasitic in carnivorous and omnivorous animals, in which the tail is sharply pointed, and the eggs ordinarily hatch before leaving the host's body, or even before oviposition. A detailed description of *Strongyloides stercoralis felis* is given and comparisons made between this form and the *Strongyloides* of man and the *Strongyloides* of Asiatic monkeys and apes. The question of transfer of *Strongyloides* between cats and man is not settled; for the present the cat form is considered a hostal variety of the human species.

Dr. J. P. Cullen has recorded nine cases of infection with *Schistosoma japonicum* in Chinese in the Northern Shan States of Burma. Although all but one of these cases gave a definite history of residence in neighbouring parts of China, especially Yunnan, which has been shown to be an endemic locality, the very important question arises of the possibility of the infection establishing itself in Burma, if it has not already done so, and spreading over that country.

Dr. J. B. Christopherson has questioned Dr. Hamilton Fairley's suggestion, based on experiments on goats, that emetine may prove more effective than antimony tartrate in the treatment of human schistosomiasis. He collects the available evidence to show that antimony tartrate is lethal to the eggs imbedded in the tissues, as well as to the worms, and he is convinced that relapses after treatment are due to faulty therapeutic technique. Emetine is more toxic to the host, more expensive, and in Dr. Christopherson's experience less effective. Antimony tartrate has a very selective action on parasites and tissues and may be less toxic to *S. spindalis* than to human schistosomes. Dr. Christopherson does not believe that laboratory work can be substituted for clinical experience.

N. Prasad Shrivastava has reported a case of hydatid cyst of the right parotid and submaxillary glands. The patient recovered after it was opened and drained. The patient was a *Gond* who had presumably eaten vegetables contaminated with dog's faeces. Daughter cysts were encountered all over the field of operation. Dr. Frank Ware has reported one case of sterile hydatid cyst of the eye in India, and three cases of *Cysticercus cellulosus*, two of them ocular and one cerebral. Dr. Chandler has recorded a case of infection with *Bertiella satyri* in a Hindu child, the second case on record. What appears to be the same species has been

found in hoolock monkeys which died in the Calcutta Zoological Gardens. The worm was about 275 mm. in length, and about 10 mm. broad.

M. A. Moghe has described a number of new species of Cestoidea from Indian animals, and has discussed the relationships of the species and genera to which these worms are allied.

Anthelmintics.—Dr. Chandler and A. K. Mukerji have summarised the work done at the Calcutta School of Tropical Medicine on carbon tetrachloride and carbon tetrachloride accompanied by oil of chenopodium. They point out that an anthelmintic should be judged on the basis of (1) safety for the patient, (2) effectiveness in expelling worms, (3) simplicity of administration on a large scale, (4) lacking of unpleasantness in taking or in after effects, and (5) cheapness. No one anthelmintic can be expected to be effective for all kinds of worms. CCl_4 in doses of 3 to 5 c.c. is regarded as being as safe as any effective anthelmintic and distinctly safer than oil of chenopodium, providing (1) that the drug comes up to a certain standard of purity, (2) that it is accompanied or followed by a saline purge, (3) that it is not used in the case of under-nourished or very weak individuals or patients having hepatic cirrhosis or other liver lesions, and (4) that fats and alcohol, and preliminary starvation, are avoided when it is used, and a diet rich in carbohydrates is given. CCl_4 is well tolerated by young children, pregnant women and kala-azar and malaria patients. It is distinctly superior to chenopodium in eliminating Necators, but only on a par with it for ankylostomes. It is cheap and easily administered, the preferred method of administration being as an emulsion in skimmed milk. It has some action on *Ascaris* and *Oxyuris*, and promising results against the latter have been obtained from rectal injections of the drug emulsified in warm milk. There is practically no action against *Trichuris*, *Strongyloides*, or tapeworms. Accompanied by oil of chenopodium, its action against ankylostomes is superior to that of either drug alone, and the combined treatment is recommended for mixed infections or where *Ascaris* is common. The chenopodium is given in a capsule (15 min.) followed by CCl_4 in milk (60 min.). For field work it is suggested that these dosages might be reduced. The effect of the combined drugs on the host appears to be no greater than the same dosage of either drug alone. In experimenting on the effects of diet and other factors on the damage done by CCl_4 , Dr. Chandler and Major Chopra found that CCl_4 was very highly toxic for cats, in contrast to results obtained elsewhere, and the use of the drug in these animals appears to be absolutely contraindicated.

LEPROSY.

Dr. E. Muir, Leprosy Research Worker, Calcutta School of Tropical Medicine, reviews the year as follows:—

"Dealing with the Leprosy Problem in General.—During the year 1925 there has been a very remarkable increase in the interest taken in leprosy by the medical profession. This is due largely to the realization that leprosy, instead of being an infirmity and misfortune which cannot be remedied, is a highly remediable disease, especially when it is dealt with early.

Up till lately teaching with regard to leprosy in the medical schools and colleges of India has been next to nothing, and there are but few of the present generation of doctors who are accustomed to diagnose it from its early signs. Now that it has been realized that leprosy can be treated with success, efforts are being made by medical authorities to educate the medical profession and through them, the public at large, with regard to the essential facts of the disease.

The main effort has been made in connection with the British Empire Leprosy Relief Association and its Indian Branch. In January, His Excellency the Viceroy made an appeal for funds to place this newly started Association on a sound financial basis.

Up-to-date, over 17 lakhs have been gathered and a programme of work has been adopted by the executive of the Association which is as follows:—

(1) The appointment of a well-qualified medical man who shall carry on research work during part of his time and also visit various provinces where he shall deliver lectures to doctors and medical students, initiate clinics for the treatment of leprosy, especially of early cases, and otherwise give advice and stimulate local effort towards dealing with the disease.

(2) The special training of medical men in the diagnosis and treatment of leprosy. Doctors will be selected who are in charge of clinics in various central positions, such as large mofussil towns; epidemiological officers and those in charge of leper asylums will also be selected and sent, in the first instance, for training to the School of Tropical Medicine in Calcutta, to undergo a fortnight's course of special training in leprosy. Later on, it is hoped that, as more local experience is gained, this training may take place in connection with leper institutions in the various provinces.

(3) Propaganda work will be carried on extensively.

It is realised that what is required most in dealing with leprosy at the present time is to bring it to the light. There is no reason to believe that the disease is either increasing or diminishing at the present time. If, in spite of the ignorance of the disease which leads to the passing over of its early symptoms and not recognising it at the stage at which it may be most easily dealt with, leprosy in India is at present at a standstill, there is every reason to hope that, when the medical profession is as well informed with regard to leprosy as it is with regard to other common diseases, and when doctors have had an opportunity of educating the people at large with regard to this little understood malady, there will be a rapid diminution of its endemicity, if not a rapid stamping out of the disease from all but the most remote parts of the country.

Efforts being made in other countries.—In Australia leprosy has been a notifiable and quarantinable disease for three decades, and yet is still as prevalent as ever in some of the states. It is interesting to note that this is attributed to the early stages not being recognised or not reported by medical men; as in the case of a small outbreak among the natives of Roebourne, Western Australia, prompt isolation of the first four cases stamped out the disease. In Queensland unless cases found to be bacteriologically positive are isolated, it is not recognised that it is important that arrangements should be made at regular intervals to detect the early infective stage, while cases outside the lazarets should receive regular treatment.

In Canada there is a lazaret at Taracide to which lepers are admitted from all parts of Canada. There is another lazaret on Bentinck Island in British Columbia, in the former there are 10 and in the latter 9 patients. 'The importance of early diagnosis cannot be too much emphasised, because, if a leper is discovered within five years of his arrival in Canada, he can be sent back to his native country,' and because if early diagnosed he has a fair chance of recovery under treatment.

Other reports are given with regard to Morocco, the Soudan, the Central Pacific and many other parts of the world, showing that an increased interest is being taken in dealing with leprosy and in almost all cases emphasising the importance of recognising and dealing with it in its earlier stages.

Rat Leprosy.—Some interesting papers have been published by Professor Marchoux of the Pasteur Institute of Paris on rat leprosy. This disease is well known in the Parel Laboratory in Bombay where large numbers of rats are examined in connection with plague prophylaxis; and the study of this disease, the organism of which is different from that of human leprosy, though very similar to it, should furnish a useful and enlightening line of research. Whether rat

leprosy is to be found in human beings in India or not, it is difficult to say, as without careful examination, the signs appear similar to those of human leprosy; but the matter is well worth investigation. Apart from this, however, the study of the pathology of rat leprosy may shed much light upon human leprosy because of the great similarity between the two diseases.

Treatment.—Various investigators have recommended vaccines prepared either from leprosy nodules or from various types of acid-fast bacilli.

In the *Indian Medical Record* for July, Lieutenant-Colonel R. W. Row, of Bombay, recommends autolysed tubercle bacilli. 'The author is quite satisfied with the results in the small number of cases of leprosy in his care and treated by the autolysed vaccine, but, as they are far too few in number, he awaits the accumulation of a few more to be in a position to publish them. Suffice it to say that in nerve leprosy at any rate the cord-like thickened nerves have come to the normal after about thirty injections. The anæsthetic patches have disappeared in a few weeks, the atrophy has been controlled and the trophic ulcers made to heal rapidly.'

Lieutenant-Colonel F. J. Palmer, R.A.M.C. (retd.) reports good results in a few cases treated with copper salts.

With all these drugs, however, only small numbers of cases have been tried, and we think it is not sufficiently clearly understood that only prolonged trial on large numbers of patients with sufficient controls can constitute a fair test for any drug in leprosy.

Leprosy is a self-healing disease and almost any irritating substance, or anything capable of producing directly or indirectly 'protein shock,' may cause marked improvement at certain stages. Moreover the patient generally seeks medical advice when the sudden onset of the reactionary phase has produced marked swelling and erythema of old, hitherto little noticeable lesions and the unfortunate victim has suddenly become for the first time an obvious leper. But as these lesions will again fade of their own accord as the next phase comes on, whatever remedy is used will give the appearance of having produced a marvellous result.

In the Cullion Leper Colony in the Philippine Islands excellent therapeutic work continues, various combinations of chaulmoogra esters have been tried and the least painful on injection are found to be combinations with iodine and creosote. 'Nephritis gave three times as high a proportion among patients who have been treated than among those who were not treated, in spite of the fact that more early cases were included among the former; indicating that the prolonged use of ethyl ester chaulmoogrates damages the kidneys in some ways.'

In India we have been finding that the pure oil of *Hydnocarpus wightiana*, extracted from fresh, ripe seeds, causes, when injected subcutaneously, far less irritation than the esters, up to 25 c.c. having been given in some cases with practically no pain. It is likely, therefore, that injections of oil will take the place of injections of esters, especially as the former, as far as our experience has gone, is at least as effective therapeutically as the esters; it is moreover very much cheaper.

Too much emphasis has probably been laid upon the injection of drugs, useful as it is: even more important than injections is exercise in the effects it has in causing improvement. It is significant that in various provinces of Eastern India the word for 'leper' and the word for 'laziness' are synonymous. Leprosy may often lead to laziness, as the leper is often precluded from work, but it is equally true that laziness and lack of exercise produces the most ideal conditions for the growth of the lepra bacillus in the body. It is also equally important to eliminate from the body any concurrent or predisposing disease or other circumstances which may lower the general resistance of the body. This aspect of the treatment of leprosy has, up till now, been overlooked, but, as in tuberculosis,

the general treatment of the patient's condition must always take precedence of any special injections."

Colonel Palmer, R.A.M.C. (retd.) having decided to try the effect of various metallic salts in leprosy, commenced with the oral administration of copper sulphate in $\frac{1}{2}$ grain doses in pill form daily in courses of three weeks' treatment with one to two weeks' intervals. Two cases treated shewed in one instance enormous improvement, in the other apparent cure. But a very marked reaction was noted in the leprosy tissue. He next went on to the use of copper citrate intravenously; copper citrate $\frac{1}{2}$ grs., sodium citrate 4 grs. in solution; and of bismuth, given as tartrate intravenously in doses of 2 to 3 grains. The doses are given fortnightly over a period of two months or so. His results were as follows:—Slight cases, 5, which all shewed marked improvement or cure. Advanced cases, 3, all of whom shewed definite improvement. He concludes that the treatment is of such value that it may hold out a prospect of cure through the induction of specific reactions.

Major W. D. H. Stevenson writes of the Wassermann reaction in leprosy, using Hecht's modification. Of 15 anæsthetic cases, 2 gave a ++ reaction, 2 a — reaction, the rest a partial reaction. Of 37 tubercular and mixed cases, 7 gave a ++ reaction, 1 a — reaction, and the rest a partial reaction. The globulin content in leprosy blood as estimated by Noguchi's technique, is very high; certainly higher than that of treated syphilitic patients. Yet leprosy sera may have a high globulin content and only give a weakly positive or even negative Wassermann reaction. (As the subsequent and much more extensive work by Dr. Muir and Major Lloyd has shewn, a positive Wassermann reaction in leprosy appears to be always the result of syphilis, and not of leprosy; such patients improve, not only as regards their syphilis, but also with regard to their leprosy, on thorough anti-syphilitic treatment).

M. N. De records a case of nodular leprosy with extraordinary lesions closely simulating those of yaws. The lesions were quite atypical and very acute. Innumerable leprosy bacilli were found in films from the pustular lesions and the patient was clearly in an acutely infective state.

Dr. D. A. Turkhud writes to say that there is now some considerable evidence that *gangosa* exists in India as a disease quite separate from either leprosy or syphilis.

PULMONARY TUBERCULOSIS.

It can no longer be said that the medical profession in India is not awake to the ravages of this terrible disease in India. As paper after paper published all over the world of recent years has shewn, phthisis is an entirely different disease in the European and in the Asiatic. In the former infection usually occurs in infancy, or childhood, becomes latent, and may flare up in adult life; but phthisis is then a very slowly progressive disease with a relatively long period of years of life before the patient, and very considerable prospects of spontaneous cure. In the Asiatic—usually an immigrant to a big city from a rural district—the adult soil is virgin ground, and there has been no previous immunising infection in childhood; phthisis is usually from infection from the human and not bovine strain—owing to the habit of universal spitting—and it is a terrible and destructive disease, killing its victims in a period often to be measured within a few months.

No medical man working in any large Indian city can fail to be impressed with the awful phthisis problem. In Calcutta there are a few beds for patients on the roof of the Medical College Hospital, with a very extensive waiting list, and provision is made for European patients at the Presidency General Hospital. But there is not a sign of any real attempt to grapple with this terrible problem; and anyone who sees a considerable out-patient clientele during the year is bound to be saddened with the mournful procession of

dhobis, mistris, clerks and their relatives stricken with a rapidly fatal disease, and with no prospect of proper nursing and care. If there is any philanthropist in Bengal who wishes to deserve well of the city of Calcutta in which he has made his fortune, the writer would impress upon him the terrible position with regard to phthisis in the Indian cities. Dr. Crake, Health Officer to the Calcutta Corporation, has drawn attention to this matter in report after report; Dr. Sandilands, Health Officer, Bombay, has also commented upon it; and small tuberculosis dispensaries attempt the impossible task of grappling with this problem in the two greatest cities of India. But the real position is far beyond their strenuous but inadequate endeavours. India possesses unrivalled hill stations where strong sunlight and the purest of mountain air—equal to any in Switzerland—are to be found; it is there that healing sanatoria can be founded. They are not merely badly, but most desperately needed.

This journal may perhaps have contributed slightly to focussing attention upon this terrible problem; but we are glad to note that the *Calcutta Medical Journal* and the *Indian Medical Record*, with its special tuberculosis number last July, have also taken it up. Phthisis is not a subject to argue about in Indian cities; it is a veritable messenger of death itself.

Of very numerous papers dealing with this problem in India, we would select first that by Sir Leonard Rogers on the incidence of pulmonary tuberculosis in India in relationship to climatic factors. India is a land in which the relationship of rainfall to phthisis incidence can be especially well studied, since its rainfall incidence varies from 500 inches a year at Cherrapunji to 5 inches a year or less in the N. W. F. Province. And all over the country there are carefully collected jail and army statistics for investigation, whilst accurate meteorological data have been maintained for several decades. The following rates shew the very close co-ordination between phthisis incidence and rainfall:—

	Phthisis ; incidence per mille.	Rainfall ; inches per annum.
Bengal and Orissa ..	13.7	75".
Madras Presidency ..	10 to 12 in different parts.	30 to 50".
West Coast ..	10.9	100".
N. W. Frontier ..	4.3	5" or less.
Himalayan hill tracts	3.6	

There exists a well-defined belt of territory, with a phthisis incidence well below the average, and about 5 to 7 per mille, which extends right across Central India, and includes Sind, E. Rajputana, Central India and the Central Provinces. This belt has a low or moderately low rainfall, limited to the period of the south-west monsoon. The Deccan has the lowest absolute humidity in India during the monsoon period at a figure of 2.7, also a specially low phthisis incidence. These areas correspond to those with a very low incidence of phthisis. On the other hand the very high incidence in Bengal and the west coast closely corresponds to the heavy rainfall from the S. W. monsoon; that in Madras Presidency to the N. E. monsoon; and the moderately high incidence in Burma to the fact that the Burma coast feels the full effect of the monsoon currents. In Central India a low phthisis incidence is associated with but feeble monsoon currents of low penetration.

Assam shews exceptional figures, a low phthisis rate of 4.5 per mille with a high rainfall. Here, however, the Surma valley is protected from heavy rainfall by the Arrakan and Tippera hills; and the Brahmaputra valley by the Khasi and Jaintia hills. The author concludes as follows:—"The direction, steadiness and strength of the rain-bearing winds appear to be the most important factors, in addition to high rainfall and absolute humidity, in influencing the prevalence of

pulmonary tuberculosis in India. . . . Their bearing upon the choice of residence for an actual or potential phthisis patient and on the choice of sites for sanatoriums is obvious."

In other papers which are very numerous comment is made upon the aetiological factors in phthisis in India. Of these we would especially select that by Ashutosh Roy, as a paper which is the result of many fruitful years of work in India by an author very fully acquainted with the conditions which he describes. The factors which he especially incriminates in the great incidence of phthisis in Indian cities are the following:—the substitution of city for rural life; the multiplication of industrial concerns and institutions throughout India; the increase in means of communication; universal spitting; the increase of slums and *bustees*; the dust, heat, and humidity of most Indian climates; the debilitating influence of concomitant malaria and other tropical fevers and diseases; the joint family system among Hindus; leading to the existence in most households of retainers who are poverty-stricken and who constitute foci of the disease; early marriage and the purdah system; the cramped conditions of school and college life in general in India; insanitary restaurants, public places of amusement and public conveyances throughout the towns and cities of India; alcohol; and, with regard to Hindus, the general insufficiency in proteins of the Hindu diets. It is a long but interesting list; but it is difficult to see how it can be dealt with. The solution of the phthisis problem in India is similar to that elsewhere; proper town-planning and the eradication of slums; yet under present Indian financial conditions such a solution appears as distant as the Greek calends, although the work of the Calcutta and Bombay Improvement Trusts constitutes a notable step in advance.

Rai Bahadur G. C. Chatterji comments on the considerable number of Indian patients who have at one time or another of their lives had declared tuberculosis and yet have lived to a more or less healthy adult age or even later. Lieutenant-Colonel R. Row's autolysed tubercle vaccine has already been referred to in the previous section on leprosy, and also in our review for the last year. It is prepared as follows:—a 4 to 6 weeks' growth of tubercle bacilli upon glycerinated brain-agar is killed and autolysed for some months. A putty-like mass of agglutinated tubercle bacilli results, many of which are now non-acid-fast. This is de-fatted, dried, weighed and the requisite doses made up in saline. Doses of from 0.01 to 0.02 mgm. are recommended for weekly injections. In guinea-pigs the results are conflicting; but these animals are unsuitable for experiment, as it is impossible to control the degree and intensity of tubercular infection in them. Indian patients further are difficult to deal with; many of them are half-starved, phthisis is usually an acute disease in the Indian but little amenable to any form of treatment, whilst their social hygiene is bad. But the results in general are perhaps encouraging.

RELAPSING FEVERS.

The remarkable work by Lieutenant-Colonel J. Cunningham on the serology of the spirochæte of relapsing fever was the subject of a paper read before the Royal Society of Tropical Medicine and Hygiene, and has been fully reviewed in our issue for January, 1926, p. 30. Briefly, he has shewn that the spirochætes present in the first febrile attack and those present in the first febrile relapse shew entirely different agglutination reactions, although morphologically identical. Inasmuch as such serological reactions are usually held to be the most constant and determinative features of closely allied bacterial strains, this opens up a wide field for investigation. If these two different types be designated *A* and *B* respectively, then the first febrile attack may be due to the *A* strain, but more rarely to the *B* strain; and strains *A* and *B* alternate

regularly. The work was carried out on monkeys at first, but later on Madras squirrels, which proved suitable experimental animals. The use of a spirochætal vaccine was also studied. This work is still in progress; but already it raises most important questions as to the mutation of bacterial types, the relationship of the true cholera vibrio to its morphological allies, e.g., and the like. In the discussion which followed Colonel Cunningham's paper some of the most distinguished bacteriologists in London took part; and the further and fuller report promised later will be widely studied with much interest.

T. K. K. Nair draws attention to the frequency of acute dysentery just before or just after the first febrile crisis in relapsing fever patients. He has failed to find *entamoebæ* in such stools, although the relapsing fever spirochæte is, of course, present, as blood is present in the dejecta. Many deaths occur from this cause in patients already weakened from the first attack of fever. Emetine in treatment of this dysentery proved a complete failure.

The spirochæte of rat-bite fever has been the subject of an unfortunate controversy during the year. To Lieutenant-Colonel R. Row belongs the credit of first clearly demonstrating the existence of this spirochæte and of this disease in India (Bombay) many years ago; although—as Robertson points out—probably Vandyke Carter saw it as long ago as 1887. To Dr. M. J. Parmanand belongs the credit of proving that it shews the presence of terminal flagella—(difficult to stain and to make out, as admitted by every one who has worked on the disease, but undoubtedly there);—that it thus corresponds in morphology with the strains isolated by the Japanese and English workers; and that the common bandicoot, *N. bengalensis*, is its commonest host in Bombay. The figures for incidence were for *N. bengalensis* in 11 per cent.; *Mus rattus* 2 per cent.; *M. decumanus* nil. Dr. Parmanand's inoculated animals were sent to Professor Futaki in Japan, who also exchanged the Japanese strain with the Bombay one; and the identity of the two species was confirmed by both workers. Colonel Row still claims that the Bombay strain, first isolated and examined by himself, differs from the Japanese one; but the writer, at least, has seen the terminal flagella and is prepared to support Dr. Parmanand. In Calcutta the disease is now almost a common one. The patients were admitted during 1925 to the Tropical Diseases Hospital for Tropical Diseases, from each of whom *Spirillum minus*, the causative agent of rat-bite fever, was isolated in inoculated animals; whilst other cases were seen in out-patients, one of whom proved curiously resistant to courses of injection with organic arsenical compounds.

The recent epidemic in Madras of relapsing fever appears to have disappeared, to judge from recent reports.

DIABETES.

Major R. N. Chopra and Dr. J. P. Bose record complete failure in the treatment of diabetes with *telakuchia* (*Cephalandra indica*), an indigenous drug with a certain reputation in the treatment of diabetes by the indigenous systems of medicine in India. On examination the extract is shewn to contain an enzyme with amylolytic properties, a hormone, and traces of an alkaloid. None of these produced any fall of blood-sugar when injected into rabbits. The fresh juice was tried clinically on 6 patients with diabetes without in any way affecting their blood-sugar or urinary sugar content.

S. L. Bhatia and G. Coelho record the results of a series of observations on the blood-sugar of Indians; 38 normal Indians who lived in Bombay being examined. Of these 18 lived on a mixed diet, whilst 20 were pure vegetarians. The vegetarians shewed an average blood-sugar content of 0.149 per cent. as against a figure of 0.116 per cent. for the non-vegetarians; they also shewed less carbohydrate tolerance, and glycosuria was more common amongst them. The first author

has also continued these studies further. The average blood-sugar content for persons in Europe is given by different authors as being about 0.1 per cent. as against the above figures, whilst the sugar tolerance (after the ingestion of 50 grs. of glucose) is normal. Of 20 vegetarian Indians examined, 12 shewed a trace of sugar in the urine after ingestion of this amount of glucose, whilst their average blood-sugar when in health was 0.149 per cent. Persistent ingestion of a diet rich in carbohydrates appears to lower the renal threshold for sugar in vegetarians in India.

Rai Bahadur Dr. U. N. Brahmachari and P. B. Sen also contribute to the same problem from Calcutta. They conclude that defective sugar tolerance is manifested by many medical students in Bengal living on a diet rich in carbohydrates, and that such subjects are potential diabetics.

L. M. Ghosal comments on the frequent apparent failure of insulin treatment in India. He notes that (a) patients with marked diabetes may still shew no pancreatic defect, when tested by Cammidge's method. Some of these live for a long period of years in good health. (b) Another group may shew very marked pancreatic defect, and have no glycosuria. (c) A third group shew typical glycosuria plus pancreatic defect; these are always in bad health, shew rapid emaciation, and respond well to insulin. The use of insulin should be confined to the third group. His statements are controverted by Dr. J. P. Bose, who states on a basis of some 400 patients treated that insulin treatment is not ineffective in Bengal. Cammidge's chemical test on the stool for pancreatic deficiency is not reliable, and the Mayo clinic considers it "both valueless and misleading." It measures only the excretory activity of the pancreas; not its endocrine activity. The author mentions nowhere in his article the glucose tolerance test, which is the test for activity or otherwise of the islet cells of Langerhans. Insulin treatment is of the greatest possible value in Indian practice, if patients be properly selected and controlled.

"DEFICIENCY DISEASES": EPIDEMIC DROPSY; LATHYRISM, ETC.

In a final paper Majors Acton and Chopra summarise their work with regard to *epidemic dropsy*. The conclusions of these authors—based upon exhaustive experimental study—are as follows:—

Epidemic dropsy and epidemic beriberi are different clinical aspects of a toxic syndrome caused by the ingestion of certain poisonous pressor bases formed in husked, parboiled and stored rice under certain conditions of temperature and humidity. Such diseased rice can easily be detected by the water test, when the diseased grains shew a dense white opacity in more or less of their substance, as compared with the normal translucence of healthy rice. In such diseased grains a spore-forming bacillus of the *B. vulgatus* group is constantly found. These bacteria attack the rice, particularly during the hot, humid months of the monsoon, and especially when the grain is stored in unventilated rooms and godowns. In highly polished rice, with the aleurone layer removed, such rice is especially liable to invasion by these bacteria. Further, parboiling kills the enzymes in the grain and renders it still further liable to bacillary invasion. These invading bacteria have been demonstrated, together with their spores, not merely upon the surface, but in sections within the diseased tissues of rice which has caused the two diseases concerned.

Experimentally, rice sprayed with emulsions of culture of this bacillus, under the necessary conditions of temperature and humidity, forms exactly the same poisonous pressor bases. Under other conditions of temperature and humidity infection of the grain does not occur.

These poisonous pressor bases have been extracted (a) from diseased rice which has been the cause of the diseases in man; and (b) from rice experimentally infected under the above conditions in the laboratory.

When tested under the conditions of rigid pharmacological experiment they produce the symptoms characteristic of epidemic dropsy; oedema, heart effects, increased intra-ocular pressure, para-sympathetic paralysis; controls with extracts from normal and non-infected rice do not produce these symptoms. In sterile rice medium inoculated with this bacillus the same pressor bases are formed and on experimental test have the same actions. The neurotoxin which seems to be responsible for beriberi is only produced at a storage temperature of 50°C., and under anaerobic conditions. The epidemic dropsy toxin, on the other hand, is water-soluble, whereas the beriberi toxin is alcohol-soluble, and the former is more readily produced. The water-solubility of the epidemic dropsy toxins leads to their presence in the cooked rice taken by Hindu widows, and hence to their special susceptibility to epidemic dropsy, inasmuch as they take a sole rice diet of wet-cooked rice. Finally, individual susceptibility, which largely depends upon the "barrage" presented by the liver to all pressor bases, which it is largely capable of adsorbing and neutralising, and of the endocrine and especially of the adrenal mechanism, controls the incidence of the disease, determining which—of many exposed—to infection will develop the disease. The pericarp of the rice contains the "vitamines" and these occur in association with a layer of protective bacteria in the pericarp, which not only defends the rice from invasion by the poisonous bacteria mechanically, but also defends it by bacterial enzyme action; thus explaining the rôle of the vitamins in antagonism to beriberi and epidemic dropsy. Lastly, adrenalin, administered both subcutaneously and by the mouth has proved the most efficient line of treatment for cases of epidemic dropsy.

In connection with *lathyrism* the position is obscure. As is well known, Major Acton attributes this disease to the ingestion of *khesari dal* which produces certain poisonous principles under certain conditions of temperature, humidity and harvesting; also he has the advantage of having extensively studied the disease upon the spot in the districts where it occurs. Major L. A. P. Anderson, A. Howard, and J. L. Simonsen have continued their studies upon lathyrism in 1925. *Khesari* seeds, of *Lathyrus sativus*, contain no alkaloid. Feeding experiments with these seeds in ducks and monkeys over long periods did not produce any of the symptoms of lathyrism. In the fields, however, *khesari* is usually contaminated with a weed, *akta* (*Pisum sativum* var. *angustifolia*), and this contains the alkaloids vicin and divicine and a glucoside, viciamin. On inoculation into guinea-pigs divicine produces characteristic symptoms and death. *Akta* feeding causes death in ducks, together with a very characteristic train of symptoms affecting the nervous and muscular symptoms, as also especially well shewn in experimental monkey. Some of these symptoms correspond to those of lathyrism in man, but others do not; and the authors conclude that they cannot yet state that *akta* weed is the cause of lathyrism in man.

Of biochemical studies in connection with deficiency diseases in general, the studies in blood chemistry of normal Bengali students by H. N. Mukherjee and J. C. Saha deserve notice. These workers studied 40 normal Bengali students. They find that the non-protein nitrogen, total nitrogen, urea and creatinin content of the blood in these subjects was less than normal; on the other hand the uric acid content was definitely higher. In a subsequent study the first author continues the same work. The calcium and inorganic phosphorus content do not differ from generally accepted normal standards; but the cholesterol content was considerably lower than in Europeans; 124 to 160 mgms. as against 140 to 170 mgms. The Bengali diet may perhaps be deficient in cholesterol.

DISEASES OF THE THYROID.

Closely connected with such biochemical studies comes the study of diseases associated with the thyroid gland.

And here the first place must be accorded to a long and interesting paper read before the Ulster branch of the British Medical Association by Lieutenant-Colonel R. McCarrison upon this subject, which—over many years of careful experimental work—he has made particularly his own.

Thyroxin, he states, is the most important product of the thyroid gland. In general the thyroid is the regulator of the rate of metabolism in the body; also the gland is essential to iodine metabolism in the body. Kendall has further extracted from the thyroid an active principle which is mainly concerned with the nutrition of the skin and its appendages.

Thyroid disorder may begin (a) at the threshold of absorption in the intestine. (b) Secondly, there may be interference with the normal functions of the gland in disturbance of the utilization of its products in the tissues. (c) The medium of communication between the threshold of absorption and the threshold of utilization is the blood plasma, which may also be disordered.

Turning to disorders at the threshold of absorption, there may be inadequate absorption of iodine or of tryptophane. The aetiology of simple goitre is not as simple as supposed, but deficient iodine intake is a most important factor, and the addition of iodine to water supplies in many endemic goitrous areas is now a common practice. But at Christchurch, New Zealand, although addition of iodine to the diet lowered the goitre incidence in children in the schools from 55 to 39 per cent., yet the 39 per cent. incidence in previously non-goitrous children shews that simple administration of iodine is not the complete solution of the problem.

Secondly, filthy surroundings in animals lead to the production of goitre in them. The iodine intake may be sufficient, but the iodine absorption from the gut may be interfered with by bacterial action. Certain bacteria can remove iodine from organic media containing it *in vitro*, and hence probably *in vivo*. Continued ingestion of such bacteria in polluted water-supplies might cause goitre.

Thirdly, want of balance in the diet may cause thyroid hyperplasia, or excess of certain proteins or fats. Cod-liver oil is of importance in providing both iodine and vitamins.

Fourthly, excessive ingestion of lime salts for prolonged periods may cause colloid goitre.

In general, goitres arising in consequence of abnormal conditions at the threshold of absorption are preventable by the additional provision of iodine, provided that the iodine is adequately absorbed; i.e., when given with a well-balanced diet and to a healthy gut.

Turning to disturbances at the threshold of utilization of the thyroid products, after thyroidectomy in animals, as a rule, nothing is noticed for 18 days. In young lambs or kids growth then stops, whilst in adult animals there is failure of skin nutrition or of intelligence. The function of the gland appears to vary with the species of animal concerned and with its age. After incomplete thyroidectomy there is again an 18 day latent interval, and then compensatory hypertrophy of the thyroid remnant. Disturbances at the threshold of utilization are not always amenable to control by iodine administration, as the thyroid hyperplasia is the result of biochemical changes in the cells and tissue plasma. Iodine is—as it were—the lubricant of the thyroid engine, not its fuel.

Turning to clinical types of goitre, adeno-parenchymatous goitre has its favourite haunts in the great mountain ranges of the world; the incidence of the disease is low in childhood, but gradually increases with advancing age. It is associated with grossly insanitary conditions of life, and especially with contaminated water-supplies. It is curable by such drugs as thymol, and it can be prevented by providing pure and protected water-supplies. The administration of iodine to adults suffering from this condition is likely to lead to hyper-thyroidism.

Diffuse colloid goitre would seem to be most often found in low-land localities. It does not seem to shew the same association with cretinism that the true adeno-parenchymatous goitre does. The nearest approach to the experimental production of colloid goitre is obtained by feeding animals on food containing excess of lime, when colloid storage occurs almost to the exclusion of active secretions. In animals this condition can be prevented by the addition of iodine to the food containing excess of lime. According to Levin diffuse colloid goitre has its highest incidence in early life and tends to disappear after full maturity has been obtained.

With regard to childhood goitre, many such swellings are physiological rather than pathological, and a minority only of such swellings should be classified as true goitres. In the Himalayas the chief incidence is in boys of 9 years of age, and in girls of 10. Childhood goitres shew a marked tendency to spontaneous disappearance.

In certain parts of Switzerland 70 to 100 per cent. of the children are goitrous, yet only some 3 to 9 per cent. of young men are rejected for military service on account of goitre.

In general, concludes the author, in all metabolic diseases, including goitre, a multiplicity of factors is present, rather than a single one. The time has come when we must search more closely for the causes of thyroid gland disorders at the threshold of absorption in the intestine, in disorders at the threshold of utilization in the tissues, and in disturbances in the cell and tissue plasma of the gland itself.

Lieutenant E. A. Davies, I.M.D., and Assistant Surgeon P. Bell, I.M.D., advocate the intravenous use of sodium iodide in goitre, a solution of 1 grain per 1 c.c., and doses of 5 to 6 grains given intravenously every third to fourth day. In nine cases seen in the Chin Hills, marked benefit occurred in all, but the authors are doubtful of the permanency of the results.

The question of deficiency and dietetic diseases in India cannot be passed over without drawing attention to the comprehensive paper by Majors Acton and Chopra to the Medical Section of the Asiatic Society of Bengal on "Indian Diets in Relationship to Health and Disease," read on the 15th April, and summarised in our issue for July, 1925, on p. 341.

PNEUMONIA, BRONCHITIS AND ASTHMA.

During the year considerable attention has been called to the importance of pneumonia in the general death-rate in India. Thus, on an analysis of the causes of death in 1,600 consecutive post-mortems in Calcutta, Sir Leonard Rogers found pneumonia and allied diseases to be the cause of death in 27 per cent., as against a corresponding figure of 17 per cent. in 1,000 post-mortems held in London. At the annual meeting of the Assam branch of the British Medical Association, Dr. G. C. Ramsay drew attention to the considerable mortality among tea coolies in Assam from pneumonia, and incriminated as possible factors their habit of sleeping on the floor of their huts during the cold weather, and the heavy incidence of *Ascaris* infections which might possibly cause lung irritation. He asked whether the Pasteur Institute at Shillong could not investigate the problem in Assam, type the local strains of pneumococci, and issue a prophylactic vaccine.

Of greatest interest among the papers dealing with pneumonia during the year is Sir Leonard Rogers' important study of the relationship of pneumonia incidence with climatic factors in India. Taking the figures for jails, which are accurate and reliable, the following is the average incidence of pneumonia per mille of population:—Indus valley, South, including Sindh, 50; North Indus valley 25.8; Gujerat 25.5; all India 13.3; and at the other extreme of the scale the Burma coast 4.2, and South-East Madras 5.8. Baluchistan shews the highest pneumonia rate in the whole of the Indian army. As to seasonal incidence, 45 per

cent. of the pneumonia occurs during the cold weather, 31 per cent. during the hot weather, and 24 per cent. during the rains. There is a very close correlation between a high pneumonia rate with scanty rainfall and low absolute humidity. A low minimum cold-weather temperature favours the prevalence of pneumonia, and vice versa. Further, pneumonia is most marked in and shews the closest relationship with areas where there occur the greatest diurnal variations of temperature during the cold weather. In the North-Western Frontier Province, with such a diurnal variation of 30°F. and upwards, the incidence of pneumonia is very high. In the very low pneumonia areas of South-East Madras and Lower Burma the diurnal variation is the smallest shewn in India. The cold northerly winds that prevail over Northern India during the cold weather, favour a high pneumonia incidence. Chills produced by the conditions thus summarised are the most important exciting cause of the frequency of pneumonia in North-Western India.

Lieutenant-Colonel J. Cunningham, Major J. A. Cruickshank and S. Ramakrishnan have determined the types of pneumococci present in cases of pneumonia in South India, and give the following figures: type 1 = 62 per cent.; type 2 = 10.7 per cent.; type 3 = 7.2 per cent.; type 4 = 21.4 per cent. Captain R. H. Malone records a large scale experiment on the value or otherwise of prophylactic inoculation of Indian troops in Baluchistan with a vaccine prepared from types 1 and 2 strains; made up to a total strength of 1 c.c. = 5,000 millions; and two doses, each of one c.c. being given at intervals. Among 2,996 men inoculated the pneumonia incidence was 9.3 per mille; among 5,227 non-inoculated controls it was 10.7 per mille. The difference is inconsiderable. His statistics are studied by Major H. H. King who agrees that the use of the vaccine did not diminish either the pneumonia incidence or morbidity.

Nand Lal advocates a selective culture medium for the pneumococcus and gonococcus. Trypsin blood agar and potato blood agar were found to be better than simple blood agar; the former is especially suitable for the gonococcus, the latter for the pneumococcus. Age reduces the value of the medium from the point of view of yield for vaccine preparation.

Captain A. K. Nandi records an obscure case of pneumococcus infection in which the patient, a sepoy, was admitted with severe dyspnoea and precordial pain, but no pleural pain. A pleural effusion followed, and hæmoptysis at a late stage; finally 32 ozs. of fluid were withdrawn and shewed abundant pneumococci; the case appeared to have been one of central pneumonia with aberrant symptoms.

Turning to *asthma*, Major R. N. Chopra and Dr. Sudhamoy Ghosh discuss the pharmacology and therapeutics of *basak*—(*Adhatoda vasica*) an evergreen herbaceous shrub which grows abundantly all over India, and which has a local reputation. Its active principles are an alkaloid, vasicine, and an essential oil. Vasicine causes slight but persistent bronchodilatation in experimental animals, a slight fall of blood pressure and slight slowing of the cardiac rhythm. The fluid extract has well marked expectorant properties, tends to liquefy the sputum, and relieve bronchial spasm, and is of value in asthma, although of no value in pulmonary tuberculosis.

Majors Acton and Chopra contribute an important article on the treatment of asthma. Asthma is not a disease, but a symptom-complex caused by various bases, some, volatile, others non-volatile, and all probably of protein origin. In their opinion individual susceptibility to these bases is largely a question of adrenal and thyroid function; animals with high endocrine function resist the action of these bases; whilst animals with low endocrine function may be divided into those with low sympathetic endocrine function, and those with low parasympathetic function. In the group of patients with sympathetic predominance come patients who are susceptible to volatile emanations from horses,

cats and other animals; those attacked with asthma after certain articles of diet; here the treatment is to apply dermal sensitiveness tests, determine to which emanation or food the patient is sensitive and eliminate the cause; to raise the endocrine functions by adrenalin and thyroid administration, improve the metabolism by soamin, and treat any intestinal infections, such as with *E. histolytica*. In this group the eosinophile count is always high.

In the group of patients with vagal predominance, irritation in the area supplied by the vagus nerve is of importance; nervous asthmas, asthmas due to nasal defect or irritation, bronchitis with developed sensitiveness to the various causative micro-organisms fall into this group. Here the treatment is to remove all sources of irritation, increase the general resistance, administer autogenous vaccines, and advise fresh air and a liberal diet. Finally stasis of decomposition products in the blood, such as carbon dioxide in cardiac asthma or in renal asthma, may be a causative factor. Here cardiac tonics, etc., are indicated, and drugs acting on the central nervous system, such as morphia, will only give temporary relief.

The treatment of asthma, in brief, depends upon a careful and thorough examination of the patient, in order to ascertain its causative mechanism before appropriate treatment can be prescribed.

In connection with *bronchitis* S. V. Mathur and K. N. Zutshi record eight cases with *Monilia* and *spirochaetes* constantly present in the sputum, most of them sub-acute or chronic, but with acute febrile exacerbations and in some instances hæmoptysis; autogenous vaccines made from the *Monilia* proved useful.

TYPHUS AND TICK-TYPHUS.

Captain G. R. McRobert claims that the ordinary text-book statement that (louse-borne) typhus can only be nursed and treated on an expectant policy is nonsense, basing his claim upon an experience of the treatment of some 300 cases seen in Mesopotamia. We know that the period of the disease is self-limited, hence active therapeutic measures are not merely indicated, but are very necessary. Digitalis, strychnine and pituitrin should be pushed from the commencement of the disease, and brandy given if there is no cerebral irritation. Lumbar puncture with a fine needle is of value for the severe headache; intravenous sodium citrate for threatened thrombosis. One of the most important indications is to secure sleep at all costs during the early nights of the attack, in order to conserve the patient's strength, cold sponging, morphia and atropine being advocated; every typhus patient must have sleep for the first 6 or 7 days of the attack every night, even though resort be had to opium or morphia. Saline therapy is of value in the later phases of the disease, both rectal and intravenous. "Imperial drink" should be given in large quantities. Bed sores are a difficult problem, best dealt with by air pillows and water beds. As post-sequelæ defective memory, deafness, and deficient emotional control are noteworthy. The patient, if a European, should be sent on long furlough to Europe.

Lieutenant-Colonel J. W. D. Megaw, Major F. B. Shettle, and D. N. Roy discuss the occurrence of nine cases of "tick-typhus" which occurred among British troops on manœuvres in the Saugor-Jhansi area. The Weil-Felix reaction was positive to a titre of 1 in 80 in two of the cases, but completely negative in five. The disease is much milder than louse-borne typhus. Conjunctivitis and sore throat were marked symptoms. The temperature charts shew marked remissions—almost intermissions in some cases. The paper is illustrated by colour plates shewing the rash and with many photographs, and the movements of the individuals prior to the manifestation of symptoms are discussed. There is no clear evidence of tick-bite in any of the cases, but ticks abounded in the jungle-covered country in which the camps were situated.

Dr. C. E. S. Norman and C. S. Ramchandran record a still further case, that of a retired Indian army Colonel living at Trichinopoly, but a recent immigrant from elsewhere. The fever was of sudden onset with slight shivering, was continuous for 19 days; and ended by lysis. A discrete rash appeared on the third day; there was marked ocular congestion, severe headache and abdominal pain. There was no definite history of tick-bite, but his previous bungalow had been infested with ticks.

In summarising the position with regard to this malady, Colonel Megaw gives the following description of tick-typhus:—There is usually the history of a tick-bite or the patient has been in a jungle or in a house infested with ticks. After an incubation period of from one to three weeks, fever sets in with headache, joint pains, and often shivering. Sore throat and conjunctival congestion are features of some cases. The rash appears about the third to the fifth day, is a rosy, macular eruption, rather profuse and extending all over the body; later becoming dark-red and sometimes petechial. The fever lasts for 12 to 20 days and ends by lysis, more rarely by crisis. The Weil-Felix reaction as a rule is negative, and blood cultures give negative results. After convalescence, the cutaneous staining from the rash persists for some weeks. To this clinical entity he proposes that the name "tick-typhus" shall be provisionally applied. The disease closely resembles the Rocky Mountain spotted fever.

SNAKE-BITE.

A curious feature of the year is the number of cases of snake-bite of which details are given in the literature. Colonel F. Wall (ret'd.) describes the case of a sepoy, bitten at Karachi at 5 A.M. when on the way to the latrine by an *Echis carinatus* and admitted to hospital at 8 A.M. The site of the bite was incised, permanganate crystals rubbed in and 40 c.c. of antivenene given intravenously. By 2-30 P.M. the patient was restless, and had bleeding from the gums, hæmoptysis and copious oozing of blood from the wound. Pituitrin and hæmostatic serum were given and calcium lactate, 10½ grains subcutaneously in solution in 72 hours. The patient died from hæmorrhage 87 hours after being bitten. Once *Echis* venom has decalcified the blood, asks Colonel Wall, is it of any use to inject calcium salts? Also study is wanted of the best methods of calcium administration after viper bite.

S. A. S. Chuhar Singh, I.M.D., describes another case of *Echis* bite in a woman 5 months' pregnant at Hurnai in Baluchistan. Severe local pain and swelling ensued, and the patient commenced to bleed from everywhere. She gave birth to a still-born foetus 76 hours after having been bitten, and died herself 16 hours later. Jemadar S. A. S. C. Singh, I.M.D., records a further fatal case of a Mahomedan woman aged 30, bitten on the left ankle by an *Echis*. Local incision, rubbing in of permanganate crystals and large doses of calcium salts, both subcutaneously and orally, constituted the treatment. Hypertonic saline intravenously was also resorted to, but the patient died 84 hours after having been bitten. A very few marked features of the case was the exceedingly severe oedema of the bitten leg. (In the opinion of the reviewer all three cases should have been treated by local injections of gold chloride solution, plus measures against hæmorrhage. *Echis* venom is fairly deadly, but the chances of recovery are some 50 per cent. even without treatment, and the Lauder Brunton technique of incision of the wound and rubbing in of permanganate crystals has been shown experimentally by Acton and Knowles, and independently by Surgeon-General Bannermann, to be practically useless.)

On the other hand A. C. Bharadwaja records an interesting case of recovery after cobra-bite. A woman aged 25, was bitten on the left index finger by a

cobra, and was treated by a *madan*, who also caught the cobra. After she was brought to hospital severe symptoms and unconsciousness set in, together with paralysis of the muscles of the face and tongue. She was treated with strychnine injections, incision of the wound and rubbing in permanganate crystals, and 10 c.c. of Fitzsimson's polyvalent antivenous serum (prepared in South Africa) given intravenously, followed later by a repetition of the same dose. The patient recovered.

Research work on antivenene under the Indian Research Fund Association was continued during the year. The Rev. Father J. F. Caius and the Rev. Father A. Steichen, S.J., report that the absorption spectra of antivenene and of normal horse serum are practically identical and do not point to any essential difference between the two. Major L. A. P. Anderson and Father Caius have studied the effect of storage on the potency of antivenene. It gradually loses its potency over the first six to nine months. Thereafter, curiously enough, its potency increases, especially at 12 to 14 months' storage. Light and heat at ordinary room temperature exercise no appreciable influence on its potency. Captain C. de C. Martin reports that formalin diminishes the toxicity of both cobra and Russell's viper venoms and that this action of formalin is increased by heat. Heat *per se* does not, on the other hand, increase the potency of these venoms. A dilution of 0.1 per cent. of formalin diminished the toxicity of cobra venom to animals seven or eight-fold, and that of Russell's viper venom three-fold.

MISCELLANEA.

A number of miscellaneous papers in connection with general medicine call for review. In connection with *nephritis*, Major E. H. Vere Hodge comments on the staphylococcal kidney in childhood. The kidney appears to be especially vulnerable in childhood, and four illustrative cases are cited. Acetonuria is frequently present, and often severe antecedent tonsillitis. On culture of a catheter specimen of the urine staphylococcus, either with or without *B. coli*, is found. By way of treatment, a mixture containing hexamine, acid sodium phosphate, sodium benzoate should be given, and large amounts of fluids. The throat should always be examined. The condition is sometimes afebrile, but more usually febrile, and may be acute, and with convulsions—possibly due to the acetonuria. S. C. Bose further records the case of a European female aged 38, with acute synovitis of the left ankle following upon a severe attack of follicular tonsillitis; there were no renal symptoms, but examination of the urine showed copious albumin and some blood; hæmolytic streptococci were isolated on culture of a catheter specimen. Dr. A. Neave Kingsbury and K. Kanagarayer describes a modification of Goré's method for the rosindole reaction as applied to the urine, the cotton-wool plug of Goré being changed for filter paper, and a standardisation of the test introduced by the use of filter papers dipped in solutions of neutral red of different strengths. They conclude that a positive result does not indicate the presence of indican in the urine; that the percentage of positive cases is decreased in nephritic cases and increased in cases of liver insufficiency.

Dr. U. P. Basu deals with *heart diseases* as observed in Bengali patients, contrasting his experiences at Dr. Lewis' clinic in London with those in Bengal. Heart diseases, as seen in Bengal, are very different from those seen in Europe. Chronic endocarditis, mitral disease and aortic regurgitation are rare in India, in contra-distinction to their frequency in Europe. On the other hand, acute infections of the heart appear to be commoner in India, such as follow influenza, puerperal sepsis and other acute streptococcal infections. Angina pectoris, as a lesion of the coronary arteries, is rare, but anginal symptoms, due to exhaustion of the cardiac muscle, are not uncommon. In the tropics diseases of the myocardium, rather than of the

endocardium and pericardium, appear to predominate. This may be correlated with (a) the poverty-stricken diet of the Indian *ryot*; (b) the special incidence of acute fevers of different sorts such as malaria, kala-azar and the like; and (c) viscerotoposis. In brief, the problems of cardiology in Bengal differ in toto from those in Europe and deserve differential study.

Of diseases of the central nervous system, Dr J. P. Cullen records a case of muscular dystrophy of scapulo-humeral type, and Major J. B. Hance one of pseudo-hypertrophic type in a Pathian boy aged 8 years. These diseases are not uncommon in India, and their relative frequency perhaps calls for investigation. With regard to mental diseases, Dr. F. Noronha deals with dementia praecox as seen in cases in Bangalore Asylum. Some 20 to 30 per cent. of patients admitted to asylums in India come under this head. In the majority of cases there is a history of the patient having run away from home, and having in the course of his travels come into collision with the law. Irregularity of conduct is often the first great cardinal sign of the disease; and many such cases wander at large throughout India, attaching themselves to pilgrim or wedding parties or being present at fairs and festivals. The phase of vagabondage is often preceded by one of dislike of parents or house-relatives. On admission, such patients are often quite docile, their memory for events quite good, but their emotional instability is shewn by their senseless laughter or purposeless smiles. Within a few days of admission the patient has declared the true nature of his malady; he has either snatched another patient's food, or torn his clothes to rags, or soiled himself or the floor and walls of his room with faeces. Bizarre conduct plus clear consciousness and good apprehension of surroundings with often a good memory, serve to distinguish these patients. Many patients exhibit a condition of negativism, in which they refuse to take any interest in their surroundings, become completely apathetic and even dumb. By way of treatment suitable occupation is the first great line of treatment. The general practitioner in India would do well to recognise the considerable frequency of the disease and to learn how to diagnose its early symptoms.

Major O. A. Berkeley-Hill pleads for the introduction of familial treatment of the insane, and describes the interesting results obtained by this line of treatment at the little town of Gheel in Belgium. Here, amid a population of some 15,000 persons some 1,500 mental patients are boarded out with different families; the medical supervisor selecting where the patient should stay and with whom. The average cost per annum works out at only some Rs. 85 per year per patient, and results are good. Restraint has rarely to be inflicted. He considers the method suitable for introduction into India.

In a note upon *otorrhoea*, S. N. Consul advocates the use of acriflavine for this common complaint. The meatus should be syringed with a 2 per cent. solution (grs. 11 to the oz.); cleansed with hydrogen peroxide; and a few drops of pure acriflavine instilled, and a cotton wool plug inserted. In 11 cases out of 12 the results are successful.

In connection with *oriental sore*, D. N. Basu records an interesting case seen in Calcutta. The patient was a Hindu girl aged 5, who had been in the Punjab 6½ to 7 months before the sore appeared, a fact which appears to fix a definite incubation period, since oriental sore is not indigenous in Calcutta. *Leishmania tropica* was demonstrated in films from the sore and in its herpetomonad form in cultures; in these cultures a very few post-nucleated forms were seen, with the micro-nucleus posterior in place of, as usual, anterior to the macro-nucleus, these forms rather recalling the posterior nucleated forms described for *Trypanosoma rhodesiense*.

PHARMACOLOGY.

A considerable number of papers call for review. Major Chopra and Dr. Sudhamoy Ghosh comment on

the use of buffered solutions for perfusion of isolated organs. Ordinary Ringer's and Tyrode's solutions are unsuitable on account of their wide pH range under experimental conditions. Fleisch's solution is recommended, as its pH variation is so slight as to be negligible, and the stock solution keeps indefinitely in paraffined bottles in the tropics. Majors Acton and Chopra deal with the influence of the pH on the activity of pressor bases, and find that in general such bases act best at about the neutral pH of 7. These bases act (a) on sympathetic nerves or involuntary muscle, causing contraction or relaxation; (b) they may increase or diminish cell permeability. In different species of animals the same amine may produce quite different results; e.g., in one animal contraction, in another relaxation, in a third relaxation followed by contraction, in a fourth inhibition. Some volatile amines act best as bases; other non-volatile amines act best as hydrochlorides at a pH of 7. Further the pH of different tissues of the body varies and the defensive action of the liver against such bases is important; disease following perhaps only in such patients as have a defective liver mechanism. These factors are intimately bound up with the individual idiosyncrasy shewn in such diseases, as asthma, urticaria and giant urticaria, and epidemic dropsy and beriberi.

The use of *digitalis* in tropical medicine has been the subject of papers during the year. Major Chopra, Dr. S. C. Bose and P. De conclude that both biological and chemical assays shew that tincture of *digitalis* undergoes rapid deterioration in the tropics. Further, this deterioration cannot be accurately estimated by such methods as Hatcher's "cat method," the "frog method," or Kundson and Dresbach's chemical method. Clinical tests give the most reliable information. The average dose of 15 c.c.—or 4½ drachms—of tincture per 100 lbs. of body weight required to get the patient under full *digitalis* effect is considerably increased with tinctures which have been even for a short time exposed to tropical conditions.

The deterioration is due to some change, as yet but little understood, in the glucosides in the tincture. The doses of tincture of *digitalis* usually employed by practitioners in the tropics—i.e., from 5 to 15 m. t.d.s.—are quite useless; with ordinary tinctures a dose of 20 to 30 m. t.d.s. should be given, or if a rapid effect is wanted, 45 to 60 m. t.d.s. Signs of *digitalis* intoxication, such as vomiting, are so rare that no hesitation whatever should be felt in pushing the doses to the extreme in critical cases.

Dr. S. C. Bose returns to the same subject in a clinical study of 150 cases of cardiac disease studied in Bengal. Of these cases only 6 per cent.—as against over 66 per cent. in European cases—shewed auricular fibrillation. The average quantity of *digitalis* tincture needed to produce toxic symptoms was in Europe from 4 to 7 drachms, in Calcutta from 14 to 29 drachms. To obtain prompt results in grave cases in India the tincture should be given in doses of from 2 to 3 drachms per day for 5 days. The cases which respond best are those of failure with normal rhythm, senile hearts, marked hypertension, and fatty degeneration of the myocardium; cases of aortic regurgitation and syphilitic myocarditis do not respond so well. The toxic effects are chiefly slowing of the heart rate to an alarming degree, vomiting and diminished diuresis; but they are rarely seen with doses of less than 2 drachms per day for 7 days. A *digitalis* tachycardia has been noticed as a sudden paroxysmal phenomenon in a few patients. The same author, in a later contribution, states that he has found P. D. and Co.'s "Digifortis" preparation to retain its full potency in the tropics; with this preparation a total daily dose of 1 drgm. may be given until the patient is under the full *digitalis* effect.

Quinine has also come in for considerable attention during the year. Major J. A. Sinton gives a clinical method for estimating the amount of quinine in medicinal solutions, which will enable the practitioner to

estimate whether the quinine mixture prescribed and made up is up to strength or not. Any albumin present should be removed from the fluid by boiling with a little acetic acid; and 4 c.c. of the fluid diluted with 246 c.c. of distilled water. Of this take 1 volume and add 1 volume of Tauret's modification of Mayer's reagent. Compare the opalescence produced against a set of standard opacity tubes of Brown (as employed in vaccine preparation), or make up a set of standard tubes of known quinine dilutions as a control.

Majors Acton and Chopra have studied the concentration of quinine in the circulating blood. The administration of alkalis before giving quinine almost doubles the absorption of and percentage of quinine in the portal blood stream. The rate of quinine absorption is less in an acid substrate, such as the stomach, than in an alkaline one, and also if gastritis be present. The markedly greater concentration in the portal than in the systematic circulation after administration is probably due to the "barrage" action of the liver in adsorbing quinine. Treatment with quinine plus alkalis increases the cure rate in malaria chiefly on account of the increased absorption of quinine from an alkaline substrate. Quinine is especially effective in malignant tertian malarial infections, since its zone of greatest concentration in the portal blood stream coincides with the site of most active multiplication of the parasites in the same area. The rate of absorption of quinine is dependent upon physical laws; it is great if excess of $-OH$ ions be present, defective if excess of $-H$ ions be present.

Major T. A. Hughes comments on the effect of quinine administration on the blood-sugar. Hyperglycemia is produced in rabbits by large doses of quinine, and the effect of insulin on this condition is similar to its effect in adrenalin hyperglycemia. Ergotoxine, and to a less extent pituitrin, inhibit the glycogenolytic action of quinine. Quinine in anti-malarial doses causes a lowering of the blood-sugar in man, and this effect can be neutralised by pituitrin injection. Mild symptoms of hypoglycemia may ensue after quinine administration. These can be prevented by giving carbohydrates or a meal rich in carbohydrates half to one hour before the quinine dose is given. (It will be remembered that in Dr. Bishop's cinchona febrifuge formula given on page 2 of our annual review-supplement for last year, 10 grains of cinchona febrifuge are prescribed in half an oz. syrup.)

A very interesting discussion took place at the Royal Society of Tropical Medicine and Hygiene in December 1924, on *drug addiction in the tropics*, and is reported in the Society's *Transactions* for 1925. Professor W. E. Dixon, F.R.S., spoke of the physiological aspects of drugs of addiction; drugs so defined must either cause a great stimulation of the relatively lower cerebral centres; or they must selectively cut out the higher faculties of the mind. The Opium Commission in India in 1895 concluded that, contrary to opium having an evil effect upon the population, it tended to ward off sickness and lessened the discomfort consequent on poor food and malarial and other diseases. Opium smoking was the least objectionable form of opium habit, since the amount of alkaloid absorbed is small, and this type of opium habit is the easiest to cure. The abolition of opium export from India to China has achieved no good result; on the contrary Japan has stepped in with an ever growing opium trade, opium was now more extensively cultivated than ever in China, which had also tasted the far worse pleasures of heroin and morphine. Heroin is a terrible drug; its use is not necessary to the physician, and it should be prohibited. With regard to *Cannabis indica*, it was curious that the plant grown in Siberia did not shew the toxic properties of the Indian variety. This drug was not as dangerous as was commonly supposed; it produces exhilaration and is taken to overcome fatigue, physical or mental. D. D. Cunningham in India had a monkey which became so habituated to this drug that he resisted all attempts to remove him from the chamber in which

its fumes were administered to him, and on days when the treatment was omitted he became restless and uneasy. In India the cocaine habit is largely confined to opium and *ganja* addicts, and it is taken in the form of tablets or powder, chewed with betel leaves and slaked lime. It is the most terrible of all habit-drugs.

Major-General Sir Havelock Charles (retired) said that he saw no more harm in the use of opium in moderation than in that of alcohol or tea under similar circumstances; he had known Indian troops who were confirmed opium eaters to cover very long marches under very trying conditions without discomfort. Abuse could not be defended, of course, but for the tea coolie and the *ryot*, when his day of heavy labour was over in the fields, a small dose of opium soothes and cheers. The insurance companies do not demand any extra premium from a moderate opium eater. Further, opium is used medicinally throughout India, and the common people are well aware of its value for intestinal disorders. Opium did not lead to crime. With alcohol the case was different; of the two he considered opium far more harmless. Dr. A. Powell summarised his observations during 32 years of service in India. The excessive use of Indian hemp was usually seen among the *fakirs*, *sadhus*, and *bairagis* pestilential parasites for the most part upon the people. Euphoria—the sense of well-being—was the objective of most hemp-addicts, but probably some 50 per cent. of *charas* takers reach the aggressive stage, become quarrelsome and may commit crime. Indian alienists are agreed that hemp gives rise to a readily recognised form of insanity and describe several varieties, of which exaltation mania is common. Of 4,700 lunatics who had passed through his hands in India, in not a single instance could the insanity be attributed to opium. If hell be populated with "opium fiends" as many good people suppose, it will be a quiet, sleepy and stupid place. The morphia habit he had only seen three times, and in all instances the addicts were Europeans; he did not know what the position was with regard to heroin, but the U. S. A. exported 166,000 ozs. annually to England, and 88,000 ozs. annually to India. Cocaine was becoming more and more serious in India. Early during the war he had experimented on a group of cocaine chewers, by offering them substitutes; none of them had any use at all for either stovaine or beta-eucaine; neither was "the real stuff."

There ensued after the reading of the papers a considerable and very interesting discussion, which considerations of space prevent our summarising. Sir T. Carey Evans, I.M.S., declared that crude opium was far safer than any other intoxicant drug in India. Whisky was the *real* evil; its importation into and consumption of in India was going up by leaps and bounds. If the League of Nations proposed to take up the drug question in India, let them first control the importation of morphine, cocaine and heroin from Japan, America and Germany, and the importation of whisky from the United Kingdom.

It will be seen that enlightened medical opinion is well nigh unanimous with regard to the use of opium in India; it is the poor man's solace and the labourer's friend; the real evils are connected with the other drugs. (On the other hand the reviewer would like to add one point which seems not to have been noticed during the discussion; the indiscriminate custom of *ayahs* and Indian mothers of administering opium to infants in many different infantile ailments; a practice which often does very considerable harm.)

Any note on pharmacology in India during the year would be incomplete without mention of the publication in the *Memoirs of the Asiatic Society of Bengal* of the Rev. P. O. Boddington's "Studies in Santal Medicine and Connected Folk-lore." This voluminous work is the result of a lifetime almost of observation of and association with the Santals. Quite apart from its great literary and ethnographical value, it constitutes a

very important contribution to the study of the indigenous systems of medicine in India. Work such as this exhaustive memoir of Mr. Boddington is of great value in presenting in collected form materials for investigation by the experimental pharmacologist.

SURGERY IN THE TROPICS.

The output of surgical papers during the year appears to have been considerably greater than in 1924, and may be considered under several different headings.

GENERAL SURGERY.

Perhaps the most interesting paper during the year was that by S. K. Ray in the *Calcutta Medical Journal* on the surgery of the ancient Hindus. If the writings of Sushruta, circa 600 B.C., be studied, it is found that students of medicine and surgery were only admitted to the small schools maintained by preceptors under most rigid selection. Before any general surgical operation the patient was placed on light diet and purged; for operation he should be seated facing east and be firmly held. Rooms occupied by surgical cases should be fumigated with aromatic odours and decorated with flowers and garlands. The dissection of the human body was taught by clearing the intestinal contents of dead persons "not more than 100 years old," and placing the bodies to decompose on raised platforms built in calm and still rivers, the different structures being exposed in turn by repeated brushing with brushes made of roots, bark and hair. Forceps in general resembled the jaws or beaks of various animals and birds, and were used for removing foreign bodies; tubular instruments were used chiefly as specula and also for insufflation of powders; probes and scoops, straight and curved triangular needles were also used, and there were fourteen different kinds of bandages. Rhinoplasty was a common operation, and was introduced from India into Europe by Carpur in 1814. The best method for removing an arrow embedded in the flesh was to tie the shaft to the leg of a horse and then flog the animal; something was then bound to happen! Laparotomy for intestinal obstruction was practised, the incision in the gut being closed by applying the mandibles of biting black ants and cutting away their bodies. Ascites was tapped by a crude trocar. Fractured limbs were treated with bamboo splints and wooden pegs driven into the beds to keep the injured limbs in position. Hemorrhoids were treated by the local application of strong caustics through a crude speculum. In cases of vesical calculus, the stone was manoeuvred into the perineal region by fingers inserted into the rectum, an incision made, and the stone extracted. Cataract was treated by couching. In an editorial on Mr. Ray's paper, the *Calcutta Medical Journal* comments on the amazing wisdom and experience of these ancient surgeons; but we take it, although we have heard much lately of "the return to Ayurveda," that the editor of our very ably conducted contemporary does not seriously advise surgeons in the twentieth century to return to the use of the (septic) mandibles of black ants for intestinal suture, or to "horse-power" for the removal of embedded foreign bodies!

Lieutenant-Colonel H. Hallilay discusses "asepsis," as practised in present-day "aseptic surgery." The majority of high pressure steam sterilisers are too small, and in actual use are too over-loaded; also the pressure at which they are worked is too low, a pressure of 30 lbs. being necessary. To ensure absolute safety and certainty it is most desirable to provide every steriliser drum with a cheap and efficient pyrometer. Such a pyrometer is to be found in a small packet of flowers of sulphur, sealed up, placed inside the centre of the drum and with a black thread attached by which it can be extracted when the drum is withdrawn from the steriliser and opened. Powdered

sulphur melts at a temperature of 114.5°C., is unaffected by moisture, and if the sulphur packet in the centre of the drum be melted, the operator may be certain that everything inside the drum has really been sterilised. If such a precaution be not used, one may get the drum exposed, e.g., to temperatures of 121°C. with a temperature of only 97°C. in the centre of the dressings within the drum. A set of rules should be drawn up, framed and hung up in a conspicuous place in the sterilising room: these should prescribe in the simplest possible language the pressure at which each steriliser should work, the duration of exposure, and the number of articles to be placed within the steriliser. "It is easier for a rich man to enter into the Kingdom of Heaven than for dressings at the centre of a tightly packed drum to be sterilised." After an exposure of 30 minutes to a temperature of 129°C., the temperature in the interior and centre of the drum rose to only 117°C., with a lag of about 12 minutes in time. Anthrax and similar spore-bearing bacteria are not killed at 10 minutes exposure to 115°C.

The same author also comments on the treatment of incisional sinuses. Such septic sinuses are common in this country, especially in connection with abdominal wounds, and often the patient's mental condition after perhaps years of suffering is a pitiable one. In treatment the first step is to lay open the sinus along its whole length. All instruments used in doing so are now discarded, and fresh ones used in the second step. The ribbon of granulation tissue lining the sinus, together with the surrounding wall of dense scar tissue is next removed, if possible *en masse* in one piece. A third set of fresh instruments is next used to take away a thin slice of the apposing surfaces of the wound, which are then cleansed, swabbed with tincture of iodine, and sutured. No vessels should be tied and no suture materials left in the depths of the wound. Illustrative cases shew the rapid healing which takes place by first intention and the excellent results.

J. K. Datta describes with numerous illustrations and x-ray photographs, the technique for operative treatment of chronic frontal sinus suppuration. Two cases are cited, one of them associated with syphilitic infection. The adjacent ethmoidal cells must be dealt with. P. K. Bardhan advocates Pezzar's self-retaining catheter for the drainage of empyema, with the use of the thumb and ball of the thumb part of a sterilised surgical rubber glove glued to it with surgical sterile glue. After insertion of the catheter, this rubber surface is then glued to the skin surface with surgical glue, and provides an air-tight adhesion.

INTESTINAL SURGERY.

Colonel Hallilay discusses the operative treatment of intestinal stasis, describing and warmly advocating Sir Arbuthnot Lane's technique, which he has studied under that pioneer. After laparotomy the whole bowel is surveyed, and any bands or kinks tying down the pelvic colon are divided, and the cut surfaces peritonised. Bands at the lower end of the ileum or a controlling appendix may next require division or removal. The results are remarkably good, even such conditions as epilepsy and sexual impotence being cured by this operation.

Captain R. V. Rajam describes a case of acute duodenal ileus in an emaciated male adult, aged 50. Diffuse abdominal pain was present but no rigidity; there was an abdominal facies, tenderness over the whole abdomen, pulse 110, temperature sub-normal. At operation an immensely distended stomach and duodenum were found and a collapsed ileum. The patient died 48 hours after operation, and the condition was probably due to pressure of the superior mesenteric vessels crossing over and compressing the terminal portion of the duodenum. M. E. T. Chelram describes the case of a male Sikh, aged 30, with volvulus of the ileum, 40 inches of the lower end of which was found to be gangrenous. Primary resection of 42 inches of gut was performed, the caecal end of the ileum closed,

and its proximal end anatomosed to the side of the cæcum. The patient not only recovered, but was also spontaneously cured of a reducible right inguinal hernia previously present. The symptoms present were extraordinarily slight, despite the very grave condition found at operation; there was hardly any vomiting, temperature 99.4°F., pulse 82, rising before operation to 102. Operation was performed 33½ hours after the onset of the first symptoms. J. B. Vaidya gives an account of a case of acute intestinal obstruction due to hernia into the fossa duodeno-jejunalis, with death on the third day after operation from heart failure.

With regard to *appendicitis*, Major A. G. Tresidder calls attention to an unusual sign in retro-cæcal appendicitis; the patient adopts a prone posture lying flat on his face and abdomen, as this is the only position in which he is comfortable. Rai Sahib Mukand Lal of the Dufferin Civil Hospital, Delhi, draws attention to the frequency of appendicitis; 15 cases have been seen at that hospital in the past year. He advocates the use of a 3½ per cent. solution of picric acid in alcohol for skin sterilisation, and silk for all sutures except for those for the skin incision.

With regard to *hernia*, A. B. de Castro describes an extraordinary case of pseudo-hernia. A military police constable suffering from colicky abdominal pain applied a heated brass *lotah* over his umbilicus, on the advice of his friends, and was subsequently quite unable to remove it. Under chloroform anaesthesia the bottom of the *lotah* was removed with a chisel and hammer, but its top still remained fixed. Inside it was found an engorged, dark-blue mass of flesh. A crucial incision was made into this mass, which consisted of the whole thickness of the abdominal wall and some omentum, whereupon the *lotah* came away. The incisions were then cleansed and sutured and healing took place by first intention. P. Chatterji describes a case of post-peritoneal hernia in a Hindu male, aged 28, with symptoms of a strangulated left inguinal hernia. At operation a peritoneal opening was found 2 inches above the level of the internal abdominal ring and ½ an inch outside the lateral margin of the rectus sheath. The small intestine had herniated through this and then into the inguinal canal. M. N. S. Chetti describes a case of a partly descended testis gripped at the external oblique ring with symptoms of hernia: operation resulted in cure. The same author also records a case of acute gangrene of the testis from acute torsion of the spermatic cord, without apparent cause.

With regard to *hemorrhoids*, Captain D. R. Kehar advocates treatment by strangulation and snipping, on a study of some 300 cases. Before operation castor oil is given and enemas, a milk diet for 24 hours, and the parts painted with tincture of iodine. After exposure of the piles a half-curved needle 1½ inches long is threaded with No. 3 or 4 catgut suture thread. Loop sutures are applied above and below the base of the pile, which is snipped off after being strangled. A vaselined rubber tube is inserted and removed next day, tincture of perchloride of iron and tincture of opium being used as local applications. For 4 days the patient is given a milk diet, on the fifth day castor oil, and he is usually ready for discharge about the seventh or eighth day.

SURGICAL TUBERCULOSIS.

This has been the subject of numerous papers during the year. Lieutenant-Colonel E. W. C. Bradfield contributes a very striking article, beautifully illustrated, on abdominal tuberculosis in Indian practice. At the Madras General Hospital in 1924 cases of surgical tuberculosis admitted numbered 205, or 2 per cent. of all admissions, and 95 of them were cases of abdominal tuberculosis; a far higher figure than obtains in Europe. With regard to tubercular peritonitis two types can be recognised; (a) the ascitic type, which is comparatively rare; and (b) the fibrous-adhesive type, which is common, and of which 40 cases were operated upon. In this the symptoms are abdominal pain, fever,

and sometimes the presence of a tumour-like mass with visible peristalsis due to chronic intestinal obstruction. The pain is never of the recurrent, periodic character that marks gastric or duodenal ulcer. Operative results are, as a rule, poor. Of tuberculosis of the cæcum 20 cases were seen during the year. Again two types may be recognised; (a) an entero-peritoneal type, which is an ulcerative caseous tuberculosis attacking the cæcum, ileum and appendix, with the lungs frequently also involved, intestinal fistulae common, and with signs of enteritis and not of obstruction. (b) The hyperplastic variety, simulating a neoplasm in the right iliac fossa. This is of insidious onset with fibrosis, thickening of the cæcum walls, and increasing symptoms and signs of intestinal obstruction. It occurs at from 25 to 35 years of age. The operative treatment consists in excision of the cæcum, when possible, and lateral anastomosis of the ileum to the transverse colon. Results are on the whole good, although the Indian patient is usually seen at a very late date and tends to be a bad surgical risk. A rare variety of intestinal tuberculosis is that of the jejunum with symptoms simulating duodenal ulcer.

Dr. E. F. Neve also calls attention to the hyperplastic type of tuberculosis of the cæcum, as thus described by Colonel Bradfield. He describes two cases associated with stricture of the ileo-cæcal valve and hyperplasia of the cæcum. Both proved eminently curable, the treatment being lateral anastomosis of the ileum to the lower end of the ascending colon. R. S. Grewal also deals with the treatment of abdominal tuberculosis. In cases of mesenteric or chronic tuberculous peritonitis and *tabes mesenterica* he advocates the use of oxygen inflation of the abdomen. Under local anaesthesia the abdomen is opened by a tiny incision, the nozzle attached to an oxygen cylinder apparatus is inserted and the abdomen inflated; the opening being finally closed by a purse-string suture. The oxygen is absorbed within from 12 to 36 hours; results in six cases so treated were good.

Our contemporary, the *Indian Medical Record* gives answers to a widely circulated questionnaire as to the incidence and treatment of tuberculous glands in India, and we hope that the evidence thus collected will be summarised and published. V. G. Rele and P. V. Gharpure deal with the results of different procedures in tuberculous abscesses. Aspiration plus oxygen injection was tried on cases of tuberculosis of the hip-joint and cervical glands, but sinuses resulted. Old tuberculin ointment by inunction was tried in gland cases, a 3 to 4 months' standard treatment being given; the result was improvement. Cabot's solution—containing ether, oil of creasote, guaiacol and iodoform—was repeatedly injected into tuberculous abscesses after aspiration; with this method results were on the whole good. Sodium morrhuate given intramuscularly proved so painful that its use was abandoned.

VESICAL CALCULUS.

The tremendous importance of this subject in Indian surgery is well illustrated by the numerous papers and distinguished authors who have dealt with it during the year. Lieutenant-Colonel Henry Smith (retired) contributes notes on litholapaxy, and emphasises the value of small lithotrites in sounding for small stones, and the use of an irrigator with 4 feet of pressure. Where perineal lithotomy has to be done, the lateral operation is preferable to the median one, as it gives much more room. The mortality from sepsis in poorly-staffed and inadequately-nursed *mofussil* hospitals in India is some 40 per cent. after supra-public lithotomy—an operation which should only rarely be called for; 10 per cent. after perineal lithotomy; and but 2 per cent. after litholapaxy. For beginners, manipulative skill may be acquired by the use of a goat's bladder containing a nugget of brick, fixed to a plaster mould.

Major-General A. Hooton comments on the same question. Surgical text-books and British authors speak

of the decline of litholapaxy; yet it is the operation for India. A considerable proportion of Indian cases have large stones and septic bladders, whilst the Indian patient is far less robust than is the British one, and a much worse surgical risk. The up-country Indian *ryot* has long ago, made up his mind that litholapaxy is far better than a cutting operation, and there is no surer way of emptying an Indian hospital than by reverting to a cutting operation for stone where crushing has formerly been in vogue. The following collected figures in the practice of some well-known Indian surgeons speak for themselves:—

	Litholapaxy.		Supra-public Lithotomy.	
	Cases.	Deaths.	Cases.	Deaths.
Civil Hospital, Hyderabad, Sind. 1920-23. Lt.-Col R. W. Anthony.	1,253	7	11	3
J. J. Hospital, Bombay, 1920-23. Lt.-Col T. S. Novis.	114	1	17	5
J. J. Hospital, Bombay, 1921-24. Mr. A. K. Dalal, F. R. C. S.	13	0	8	0
Civil Hospital, Nasik, 1922-25. Lt.-Col H. J. Vernon Betts.	58	0	5	0
Agency Hospital, Rajkot. 1920-25. Lt.-Col A. Hooton.	94	2	15	0
Total ..	1532 cases with 10 deaths; case mortality 0.6 %.		56 cases with 8 deaths; case mortality 14.3 %.	

Perineal lithotomy still has its place, despite statements in text-books to the contrary; it is the operation for encysted stones and when abscess is associated with them about the neck of the bladder.

Lieutenant-Colonel R. W. Anthony comments on certain aspects of litholapaxy. The operation is easy in children as the bladder is never out of shape in them and never loculated, but it is necessary to anaesthetise deeply. A fine rubber drainage tube tied around the base of the penis is helpful, also the use of Liston's graduated metal bougies to dilate the urethra in children. In catching and crushing a stone, do not rotate the beak of the lithotrite; keep the female blade on the floor of the bladder and investigate the areas in front and behind by elevation or depression of the handle. Withdraw and then close the male blade once or twice before crushing to make certain that no mucous membrane has been included between the blades. The evacuator possesses no advantage with children; it is better to fill the bladder from a cannula and to express by pressure over the abdomen above the pubes. If the lithotrite will not lock on to a stone, tap it lightly with a hammer. Suprapubic lithotomy is indicated in some 1 per cent. of cases of calculus and perineal lithotomy in some 2 per cent.

Of individual cases of vesical calculus, Lieutenant-Colonel J. L. Lunham records the case of a stone in the bladder of a woman aged 35, found to have formed around the end of a stick 5½ inches long inserted into the vagina two years previously for the purpose of procuring abortion. The stick was found lying with its head in the bladder and the remainder in the walls of the vagina and urethra. Dr. J. W. McK. Nichols gives an account of a case which sounds a note of warning; a medical practitioner inserted an old and worn-out rubber catheter into a bladder. When he came to withdraw it, it broke, the end remaining in the bladder. Six months later the patient was operated on for a vesical calculus which had formed around

the end of the catheter. S. K. Nathan records a case of recurring and encysted calculus. A boy of 16, was operated upon by supra-pubic lithotomy for a large stone in March 1921, and in September 1924, presented himself with a hypogastric fistula through which he had voided a second stone. He was operated upon in December 1924 by supra-pubic operation when two further phosphatic stones were found in the bladder. The fistula was excised and the patient made a complete recovery. B. R. Garg records a case of vesical calculus associated with perineal fistula.

PROSTATE, BLADDER, ETC.

Lieutenant-Colonel Henry Smith (retired) draws attention to acute inflammation of the prostate, a disease which is barely mentioned in text-books, but which is one the symptoms which it is very important for the practitioner to recognise. He has operated upon as many as three cases of this condition in one morning. The disease occurs in men between 20 and 60 years of age, with rapid onset of retention of urine, perineal pain and rectal tenesmus. If such symptoms occur, the medical attendant should not hesitate to operate by perineal incision; otherwise an abscess may form and burst into the rectum or bladder. The teaching in books that a prostatic abscess which has burst into the bladder or rectum should be left alone is wrong. In either instance perineal incision and drainage should be resorted to. Acute inflammation of the prostate is *not*, in his experience, usually of gonorrhœal origin.

Dr. M. D. David advocates supra-pubic prostatectomy at one sitting for enlarged prostate. Patients should be kept under preliminary observation, catheterised regularly, the bladder daily irrigated with permanganate or boric lotion, urotropine given, and milk and barley water. Prior to operation 6 to 8 consecutive doses, each of 15 grains of calcium chloride, should be given. After shelling out the prostate, hæmorrhage should be stopped by hot irrigation of the bladder, and after operation the patient should be put into Fowler's position and supra-pubic drainage established.

S. Dutta describes a case of small diverticulum of the bladder in a male coolie aged 40, with symptoms of frequent and sudden stoppage of micturition and localised pain. The diverticulum seen through the cystoscope is illustrated in a coloured plate, but the patient refused operation.

S. C. Das Gupta comments on the frequency of carcinoma of the penis as seen in Nepal. At operation the urethra should be transplanted as low down as possible, and stricture of the urethra, requiring repeated dilatation, is not infrequent as a sequel.

ORTHOPÆDIC SURGERY.

Again a considerable number of papers call for comment,—many of them by Lieutenant-Colonel H. Halliday,—showing how very important is this branch of surgery in Indian practice. In the treatment of stiff joints, he claims, the surgical profession shews itself almost at its worst. It has adopted the methods of the bone-setter without acknowledging them, and the amount of injury which is often inflicted by forcible manipulation of stiff joints under an anæsthetic is shocking. Wounding and traumatisation of shortened muscles can do nothing but harm. What is wanted in the treatment of these cases is steady perseverance in constant massage, and passive and active and voluntary movements. The surest way of producing stiff joints is by prolonged immobilisation of joints after injury, and many such cases would never have arisen if early massage and movement had been instituted.

The same author deals with sub-periosteal excision of joints. In a case, for instance, of old standing fracture-dislocation of the elbow joint with reduction out of the question, sub-periosteal excision was followed by complete restoration of movements. The excision must be done with a sharp ruginé so that the "cambium" layer of the bone is raised together with the periosteum,

and he uses Down Bros' Ollier's ruginer with a razor-like edge. By this procedure a sufficient supply of osteoblasts is raised with the periosteum to reconstitute new bone. In the treatment of elbow-joint fractures, the same author comments on the bad and even disastrous results from putting up the fracture in full flexion, a procedure which is commonly taught. Fracture from falls at a height usually passes through the coronoid and olecranon fossa and to a variable distance above the external and internal epicondyles; the forearm, together with the attached lower fragment of the humerus being carried bodily backwards and upwards behind the lower end of the upper fragment of the humerus. Treatment by flexion and fixation means subsequent deformity and fixation in a bad position.

Colonel Halliday also deals with chronic osteomyelitis in long bones, again a subject of great importance in this country, where the condition is frequently seen. Excluding syphilis, tuberculosis, new growth and mycetoma—which together constitute the aetiological factors of a considerable proportion of the cases seen in India—the usual types of the disease encountered are:—(a) Massive necrosis of the whole shaft, chronic and following on acute osteomyelitis, with the original shaft enclosed in new bone, suppuration, and sinus formation. (b) Chronic overgrowth and sclerosis of the shaft of the bone with or without sinus formation, often with the formation of more or less large sequestra. The outstanding feature of the disease in India is its chronicity; it may persist from childhood into adolescence and even far into adult life; many patients only die after years of suffering and many scraping operations.

The surgical problem present in such cases is how to obliterate a septic cavity with rigid walls, and many different procedures have been advocated by different authors. The method described by Colonel Halliday aims at converting the cylinder of bone into a lathe, nothing but the posterior thickness of the shaft being left. An incision is made down to the bone throughout the whole length of the diseased areas. The periosteum is then carefully separated from the bone with a ruginer of razor-like sharpness, raising with it the cambium layer of bone and the bone-forming osteoblasts. Free exposure and a good light are essential. All dead bone is now excised, preferably with an electrically driven Allbee's saw. The result is a keel of healthy bone plus a periosteal sleeve. The periosteal flaps are next united along the line of the original incision and all dead space obliterated. The cavity on healing granulates from the bottom and bone re-formation is sound and not diseased. Five illustrative cases are cited.

P. C. Dutt deals with the application of extension in cases of simple fracture. An ingenious method which has been found to give excellent results at the Medical College Hospital, Calcutta, is as follows:—The limb is shaved and painted with glue containing 30 parts of water; a glue-soaked bandage is then applied to the limb, and after it laterally placed flannel bandage strips soaked in glue, to which the extension is applied. With this technique the extension does not slip, the bandages do not loosen, there are no blisters or sores, and one can always apply sufficient extension. The method is often combined with outside elastic bandages.

U. N. R. Choudhuri describes a case of ankylosis of the right knee-joint, flexed at an angle of 120°, cured by excision and synostosis in a position of full extension. The patient was cured and was able to walk with a wooden patten. P. C. Das contributes an interesting paper on left-handedness, shewing the special association of this condition with mirror-writing, squint, mental defectiveness and stammering.

ANÆSTHETICS.

Again a number of special papers call for review, prominent among which are a series by Lieutenant J. P. Arland who has been experimentally studying both

intra-arterial and intravenous anæsthesia. Intra-arterial anæsthesia was tried in dogs by injection of a 2 per cent. cocaine gum acacia solution into the femoral, abdominal aorta, common carotid and brachial arteries. Dogs stand cocaine well, and the anæsthesia produced in the areas supplied was immediate and profound, whilst no motor paralysis was observed; the anæsthesia is probably due to paralysis of the nerve endings in the area supplied by the vessel. In a monkey the pineal gland was excised under intra-arterial anæsthesia. The right common carotid was exposed and clamped; the head elevated and the neck massaged to empty the veins. A solution containing 2 per cent. gum acacia, 1 grain of cocaine hydrochloride, and 5 minims of 1 in 1,000 adrenalin solution, dose in all 20 c.c., was injected into the artery. The internal jugular vein was next clamped. Operation was conducted via a transverse incision over the occipital protuberance, and the anæsthesia was found to be very profound and the operation field bloodless. There was no shock at any time and the monkey made a complete recovery. Intra-arterial injection of apothesine plus adrenalin was tried in a volunteer in the brachial artery; anæsthesia was profound and lasted for 2½ hours with complete motor and sensory paralysis, no shock, and no bad after-effects.

Cases operated on under intravenous anæsthesia are also described. Two were patients with septic sinuses of the forearm. Here the method adopted is to bandage the arm above and below the elbow, expose the median basilic vein under local anæsthesia, and inject 40 c.c. of a 0.5 per cent. solution of apothesine against the venous flow through a cannula under pressure. The part should first be rendered ischæmic before the bandages are applied. Anæsthesia in the area between the bandages is profound and satisfactory. After operation the bandages should be relaxed slowly. Circumcision was performed in an adult under intravenous anæsthesia, the injection being given into the dorsal vein of the penis, and other cases to which the method was applied were cases of scorpion sting, amputation of the foot for gangrene, and palmar abscess. The same author, in collaboration with Captain S. G. Chavan, records the case of a patient with a scrotal hernia the size of an orange operated on under infiltration anæsthesia with a 0.5 per cent. solution of apothesine, of which drug 13 grains were used. The patient was aged 65, and a chronic bronchitic, unsuitable for general anæsthesia; anæsthesia was profound, operative conditions were excellent, and there was no shock.

Major N. C. Kapur records an amazing case of resuscitation of life after the cessation of the vital functions for a period of over 15 minutes; the operation was one for malignant growth of the larynx and the patient stopped breathing before operation was commenced.

ANTISEPTICS.

Dr. E. F. Neve extols the value of "E. C."—(Electrolytic Chlorine)—in general surgical work. He advocates for irrigation of septic wounds a 20 per cent. solution; for cleansing hands and the patient's skin a 10 per cent. strength; a 5 per cent. solution as a ward lotion; for bladder irrigation a 1 in 1,000 to 1 in 5,000 solution; for disinfection of latrines a 1 in 5,000 solution; and for sterilisation of water-supplies 3.06 m. per gallon. Details are given of tests to estimate the amount of available chlorine present.

VENEREAL DISEASES. FRAMBOESIA.

These may perhaps be most conveniently considered in this section, and together. Most important is perhaps the paper by Lieutenant-Colonel A. Denham White and Rai Sahib S. C. Dutt on toxic symptoms following the administration of organic arsenical preparations. Such symptoms usually ensue about the third day after injection and are those of brain irritability with status epilepticus, later coma, death or recovery, and sometimes after recovery, jaundice. This constitutes the

Jarisch-Herxheimer reaction, and is apparently due to a hæmorrhagic encephalitis. Two instances of this occurred during the course of 3,098 injections at Alipore in 3 years, one of them fatal. In a third case symptoms occurred on the twentieth day after a course of injections had been completed, and consisted of jaundice, status epilepticus, convulsions and death. Arsenic has a selective action on the suprarenal glands and these "nitritoid crises" are apparently associated with deficiency of adrenalin in the patient. The treatment is, therefore, to give adrenalin in large doses, e.g., 10 m. injected every 4 hours.

Other authors comment on the same problem. Captain K. Sen records 2 cases of hæmorrhagic encephalitis following novarsenobillon administration. Y. S. Row describes a case of acute fever and urticarial rash 3 days after neosalvarsan administration, with recovery. V. N. Deuskar describes a case of intense urticaria and paroxysmal coughing following intravenous administration of "914." This ensued after the second injection, following on 7 months of hectic syphilitic fever. Adrenalin and intramine were given, followed by potassium iodide and a course of 8 subcutaneous injections of sulfarsenol. At the fourth such injection there was persistent vomiting and colic; at the sixth and eighth injections paroxysmal cough and severe urticaria followed. This patient was clearly intolerant to organic arsenical compounds.

Rai Sahib S. C. Dutt gives the results of an investigation into the relative values of the Sachs-Georgi and Wassermann reactions in a series of 125 patients observed at the Voluntary Venereal Diseases' Hospital (for women) at Alipore. The results of the two tests agreed in more than 90 per cent. of cases. In sending in serum for test, it should be free from turbidity and from red blood corpuscles. If the readings are doubtful, the tests should be repeated. A positive Sachs-Georgi reaction means syphilis, but occasional cases of syphilis may give a negative reaction.

For the treatment of gonorrhœa in the male, S. Chatterjee advocates the use of "Arthigon by improved process" intravenously, together with local treatment.

Frambæsia has aroused some attention during the year. In this connection priority must be given to the paper by Dr. G. C. Ramsay on the influence of climate and malaria on yaws. The disease is more prevalent among the hill-tribes of Cachar than among dwellers in the plains, and the lesions seen are typical. The effect of climate on this disease is remarkable. During the cold season it is very rare to see a case presenting typical yellow-encrusted excrescences, but condylomata, worm-eaten dermatitis of the palms and soles, and painful joints are seen. As soon as the weather gets warmer, typical yellow-encrusted yaws is again seen, and with the advent of the rains the painful plantar lesions. Heat and moisture, in other words, appear to modify yaws, and during cold weather months the disease closely simulates syphilis. In his experience of over 1,000 cases the only tertiary lesions seen were chronic dermatitis of the palms and worm-eaten like lesions of the soles. Secondary infection of yaws' lesions with Vincent's infection converts the typical frambæsal ulcer into typical, sloughing, fetid "tropical ulcers."

What accounts for the comparative mildness of tertiary syphilis, and the relative absence of parasyphilitic diseases in Cachar? Not climate *per se*, since other authors such as Spittel and Powell describe them as prevalent in the much of Ceylon and Fiji respectively. Powell mentions cases where severe or repeated malaria appeared to cause typical yaws to subside. There is some evidence, in brief, that, whilst induced malaria is to-day a standard treatment for general paralysis of the insane, tabes and parasyphilitic diseases, the incidence of malaria may also profoundly affect the symptomatology and lesions in yaws.

Major F. A. Barker records a case of yaws imported into the Andaman Islands from the Nicobar Islands, with demonstration of *T. pertenue*. Yaws is apparently endemic in the Nicobars. M. A. K. Iyer draws attention to the prevalence of yaws in Travancore. Assistant Surgeon P. Bell, I.M.D., draws attention to the incidence of yaws in the Chin Hills of Burma. He describes numerous cases of patients with the primary chancre almost always extra-genital and usually on the anus, sometimes on the labia majora in women, and sometimes in the groin in men. Novarsenobillon treatment was far more successful than it would have been in cases of syphilis.

MISCELLANEA.

With regard to *tetanus*, M. A. K. Iyer advocates the injection of repeated small doses of anti-tetanic serum, of 1,500 units daily, in place of single massive doses, as being equally efficacious and less costly, and gives two illustrative cases. P. D. Samuel records two cases treated by daily injections of 25 minims of a 25 per cent. solution of magnesium sulphate, together with daily injections of 15 minims of a 1 per cent. carbolic solution; the injections being given alternatively morning and evening.

K. P. Lahiri advocates "Hæmoplastin" (P. D. & Co.), in the treatment of chronic intractable hæmorrhage, the dose given being 2 c.c. daily subcutaneously for four days; two illustrative cases are cited.

Air embolism is dealt with from the experimental point of view by Assistant Surgeon A. R. D'Abreau, I.M.D. On experimental intravenous injection of air into the veins of animals, he comes to the following conclusions. A few small bubbles of air injected at a slow rate are harmless. To produce the death of a bull weighing 500 lbs. a dose of 682 c.c. of air had to be injected rapidly, and estimating from this, a man weighing 10 to 11 stone would require about 170 c.c. of air as a lethal dose (the dose being measured by volume and not by weight). Symptoms commenced with a bull when 227 c.c. had been injected, and working on this calculation, a dose of 64 c.c. might be unsafe for man. In diseases such as cholera, where the specific gravity of the blood is increased, air injection would prove more dangerous. Also presumably in intravenous infusion after severe hæmorrhage. On the whole, however, it cannot be said that a small air embolus injected from a syringe during the usual intravenous administration is dangerous.

Captain D. R. Kehar advocates treatment of *varicose veins* of the leg by an occlusion operation. The vein is rendered prominent by a tourniquet, and gripped by Wakley's fenestrated artery forceps. A needle threaded with No. 5 silk ligature thread is passed through the skin under the vein and round it, and tied so as to occlude the vein. This is repeated at half to three-quarters of an inch intervals from above downwards along the whole course of the vein. The vein subsequently shrivels up and ulcers heal.

Reports on the use of *iodine intravenously* continue to come in, many of them not suitable for publication. Assistant Surgeon C. P. V. Shunker, I.M.D., however, records interesting figures for its use in an epidemic of influenza at Bellary Central Jail. The formula which he adopts is iodine 1 dr.; potassium iodide 1 dr.; water 5 ozs. 2 drms., so that 20 minims is approximately equal to half a grain of iodine. This is given in doses of from 20 to 40 minims diluted with 10 c.c. of saline. Excellent results are reported. S. N. Datta also advocates intravenous iodine in cases of lobar pneumonia and cellulitis.

Many individual surgical cases of interest are reported, and it is in this field especially that opportunities occur to the surgeon in India which his professional brother in England seldom gets. Dr. H. M. Handle records the case of a child, aged 3½, who swallowed a small metal corkscrew of the type attached to a patent medicine bottle, a little over an inch in length. He was given an ounce of castor oil

three-quarters of an hour later, and fed with bulky meals of rice and bread; 63 hours after the accident the corkscrew was passed per rectum intact in the interior of a solid stool. Dr. H. J. H. Spreadbury records the fate of a pedunculated papilloma of the tongue; the patient refused operation and a ligature was applied to the pedicle; the papilloma sloughed away and the patient swallowed it on the fifth day. P. Pant records a case of unnoticed gunshot wound of the left ankle; a policeman pursuing a dacoit stumbled and fell; next day his ankle was found to be very swollen and painful; x-ray examination showed shot lying above the left internal malleolus, which was removed and the patient recovered. A curious accident to a child of 10 is recorded by P. Chatterji; the patient climbed on to a chair to reach down a book from a high shelf; he fell and caught the front of his neck on the edge of the back of the chair. Urgent dyspnoea, cyanosis and surgical emphysema of the neck set in, the trachea having been forcibly ruptured. Tracheotomy was immediately performed and a tube inserted; the patient was discharged cured on the eighteenth day.

Major J. B. Hance records four interesting cases. The first was one of extreme hydronephrosis of the left kidney, the swelling occupying half the abdomen and of 25 days' duration following an attack of renal colic. A drainage operation was followed by blood transfusion, but the patient died. A woman of 20 had an abortion at the fourth month, subsequent to which a rounded supra-pubic tumour formed with colicky abdominal pain; operation disclosed a large chylous or semi-chylous cyst between the layers of the mesentery of the small intestine, extending down into the left iliac fossa and pelvis and compressing the whole length of the colon. At laparotomy the cyst was tapped and marsupialized, but the patient died from shock. A third case was one of scirrhus carcinoma of the breast in a Mahomedan male aged 60. A fourth was a case of chronic tuberculous mastitis in a ten-days' nursing mother, the condition being more acute than the corresponding one seen in European women. The baby was saved by bottle feeding.

Miss Emily G. Stuart records a case of encephalo-meningocele in an infant at the root of the nose—a rather unusual site. Operation was followed by death three weeks later. N. S. Narasimhan describes a curious case of contracture of the mouth simulating gangosa. There was syphilitic infection of the genitalia, also possibly of the lips, with a strongly positive Wassermann reaction. Sodium antimony tartrate was given intravenously and the lips re-formed by operation. The case may have been one of mixed infection with syphilis and infective granuloma.

HYGIENE AND PUBLIC HEALTH.

Lieutenant-Colonel J. D. Graham, Imperial Public Health Commissioner with the Government of India, writes as follows:—

"As regards public health in India the situation remains very much the same as described in the *Indian Medical Year* of 1923 and 1924. In that of 1924 I hinted at the crystallisation and concentration of certain health activities with the Central Government. Such activities as international, national, and inter-provincial public health, overseas pilgrim traffic, quarantine, major port control, epidemiological information, emigration and immigration continue to be the legitimate concern of the Central Government.

"The proposal of the League of Nations to establish an Epidemiological Bureau in Singapore was accepted by most of the Asiatic Governments, and the details concerning its creation were worked out by a representative, International Committee which met under the presidency of the League at Singapore from 4th to 13th February, 1925. I had the honour to represent British India, while representatives from British

North Borneo, Ceylon, China, the Federated Malay States, French Indo-China, Hongkong, Japan, Netherlands' East Indies, Philippine Islands, Siam and the Straits Settlements were present. Lieutenant-Colonel Norman White (retired) of the Health Section of the League, a predecessor of my own, presided. As a result of the munificence of the Rockefeller grant of \$125,000 the initial financing for the first three years was assured without calling for individual Government contribution. The machinery of the Bureau was arranged, a budget estimate for 1925-26 drawn up, a Director and Assistants appointed, and the scope of the work determined. These have been embodied in the report of the Conference, whose resolutions give the salient points.

"The Conference proposals were accepted by the League of Nations and the Bureau started functioning at the beginning of April. It deals with the collection and dissemination of epidemiological intelligence throughout the Eastern arena, that is the quadrangular area of which the four gates are Port Said, Cape Town, Yokohama and Sydney. The preliminary work of the Bureau has dealt exclusively with the incidence and spread of plague, cholera, and small-pox throughout the ports of the Eastern arena, and weekly information thereon is now received telegraphically and by wireless from about 50 ocean ports in every part of this area. The organisation is proving of practical value to the countries concerned and is partly rendered feasible financially by the adoption of a code especially devised for the purpose. I will illustrate how it affects India. My office telegraphs on Wednesday of each week to the Bureau at Singapore the infectious disease condition of the major ports, i.e., Calcutta, Bombay, Karachi, Madras, Rangoon and Negapatam. Each country does the same. These reports are consolidated and telegraphed to Saigon (Indo-China) on Thursday evening, whence they are broadcasted for the East by the powerful Saigon wireless. They are picked up at Jutogh, near Simla, on Friday, passed to my office and thence to our ports on Saturday, so that Port Health Officers on each Saturday receive information regarding all the major ports of the Far East up till the previous Saturday mid-night.

"The Bureau International d'Hygiene Publique meets for ten days twice each year in Paris. Owing to the re-organisation consequent on the creation of the Health Section of the League of Nations, the Office International has been constituted the Advisory Committee of the Health Section of the League. In previous years India has seldom been represented by her Public Health Commissioner and usually by a retired officer who on many occasions might be quite out of touch with current Indian public health matters. The Secretary of State for India has pressed for the deputation, at least once a year, of the Public Health Commissioner. I accordingly attended the meeting in Paris in April—May 1925 at which delegates from 34 countries were present. The *ordre du jour* gives an idea of the subjects considered, chief of which was the proposed revision of the International Paris Sanitary Convention of 1912. I received a very cordial welcome and was able to speak to the Committee both on questionnaires which had been circulated and on public health matters of general interest. Our Kala-azar plague for 1924, the fauna of rats and their parasites, tabes and general paralysis were all dealt with.

"In my report to the Secretary of State I suggested that much might be reproduced for the Committee's consumption from amongst our research work showing our progress in India. Japan seemed to realise the value of this. A judicious selection of one or two papers for each meeting together with a research bibliography at one meeting would help the foreign delegates to realise the amount of work which was being accomplished in this country.

"I attended for several days a technical conference at the Ministry of Health between British representatives

and representatives of the Dutch Netherlands Government in connection with the adjustment of certain international difficulties which had arisen at our quarantine station of Kamaran in the Red Sea.

"Owing to divergence of opinion regarding the necessity or otherwise of a special draft Convention or new section in the Paris Revision dealing with the Far East, the International Sanitary Conference convened by the French Government for October 1925, was postponed until May 1926, to allow of proposals such as those put forward in Dr. Norman White's draft Convention and in the Pan-American Code being thoroughly examined.

"The results of the Port Administration Conference held at Delhi in November 1924, are not yet apparent. The general sense of the local governments was obtained on certain cardinal points, and, as much legislation will be necessary, matters have begun to move in certain definite directions. That of port quarantine will in due course come under scrutiny.

"The provincial decentralisation has not been in operation long enough to allow of the creation, on its merits, of a more powerful federal health organisation than at present exists; but, as I mentioned last year, such an organisation must in time be faced."

Colonel Graham's letter is of great interest. It echoes the dominant note in both public health matters--as in general policy--of the ending of the old-time policy of nationalism and the beginning of the new era of internationalism. Public health can have no frontiers, save that of a united war front against epidemic and preventable disease, and under theegis of the League of Nations, with regard to public health matters India has both great privileges and grave responsibilities. We are glad that she was so ably represented at the conference of the Bureau International, and that she has taken her share in the foundation of the new Bureau at Singapore. Fortunately Rockefeller munificence has enabled the foundation of the Bureau and brought it into being; Colonel Graham's speeches at the Singapore Conference lead one to hope that, if necessity arises, the Government of India will see to it that the Bureau shall not fail for want of support. "The readiness with which the Administrations represented at the Conference have promised their full co-operation in the working of the Bureau on the lines proposed, may be taken as an index of their appreciation of an organisation designed to secure international co-operation in safeguarding the public health of the East." runs a paragraph in the final resolution at the Conference. A study of the minutes of the Conference shews how large a share was taken by Colonel Graham himself in creating and working out plans for the efficient organisation and running of the new Bureau. At the meeting of the Office International in Paris, Colonel Graham drew special attention to the very interesting position now reached by workers in India with regard to the kala-azar transmission problem, whilst his presence as India's representative led to the dissemination of knowledge at the meeting regarding medical research work and public health policy in India generally. In brief, we can no longer visualise India in matters of public health policy as standing aloof from and outside general world movements, but as now one of the comity of nations.

With regard to the provinces, we have received special reports from Bengal, Madras, and Bihar and Orissa.

BENGAL.

Major A. D. Stewart writes as follows:--

"In international relations and politics, narrow individualistic and selfish outlooks are being replaced gradually by a spirit of tolerance and co-operation. And this is happening not from sentimentality or by spread of any religious movement, but for the simple reason that it pays. Nations are finding more and more that

the prosperity of each is bound up in the general well-being of the community of nations, that all are mutually and intimately inter-dependent, and that disruption and war are foes to material progress and to the march of civilisation. So with hygiene, even in India the past year has illustrated these facts. The International Sanitary Convention of 1912 was in some ways a selfish measure designed mainly to benefit western nations from the inroads of infectious disease brought from eastern ports. The revised Sanitary Convention is laid down on broader principles and especially it allows that groups of nations geographically related may make conventions within the international one. Dr. Norman White's proposed convention for Far Eastern countries proposed that the port of departure of a vessel should be the basis on which ships arriving at any point should be dealt with. The revised International Convention adheres to the principle that the history of the ship during its voyage should be taken as the basis. Logically Dr. Norman White is correct, but practical commercial considerations favour the International Convention basis. The point is still under discussion. The establishment of the Epidemiological Bureau at Singapore has led to a quicker dissemination of news regarding infectious disease, while the monthly epidemiological survey of diseases has given a bird's-eye picture unobtainable before. The telegrams distributed by the Bureau have not proved of as great value as might have been anticipated in India, as the condition of the ship on arrival is still the determining factor in action. The Netherlands East Indies however consider conditions of ports of departure, and ships arriving from an infected port are put in quarantine conditions. The question of a Special International Convention for Far Eastern Countries would appropriately be discussed at the annual conference of the Far Eastern Association of Medicine which it is hoped will be held in Calcutta in 1927.

"The spirit of the times has been reflected in certain legislation in India during 1925. The International Labour Convention is an agreement of the League of Nations to which India is signatory, to mitigate conditions of labour amongst women and young persons. In India this has been given effect to in certain rules regarding the employment of young persons as lascars on board sea-going vessels, while the question of prohibiting female labour in mines has been considered. The fact that measures proposing to confer maternity benefits and to raise the age of consent were introduced into the Indian Legislative Assembly points to the direction of thought of a certain number of Indian politicians. There has been no great measure of legislation on public health subjects. The Public Health Commissioner with the Government of India is divorced from any real active interest in provincial sanitation and provincial Directors of Public Health learn more of sanitary happenings in other provinces from the newspapers than from any other source. Public health legislation as a whole needs careful revision. The need for a public health organisation in the rural areas especially is recognised by all. In Bengal, such a nucleus has been in existence for some time and is entirely a local one, appointed by and under the direct control of district boards. In other provinces as in Madras and the United Provinces, such a staff is partly at any rate provincialised. Which principle is correct is a matter for discussion, but all are agreed that the initiation of such a staff and its development are absolute necessities for the improvement of provincial public health. Bombay has passed a Food Adulteration Act and is framing rules for standards. Bengal probably does more practically in the matter of food adulteration, having an Act and rules of standards and three public analysts in the province. Most local Governments have Food Adulteration Acts but some yet lack facilities for their execution. The Calcutta Corporation has in its new Municipal Act been provided within ample means for coping with adulterated foods and drugs. Its Sub-Committee on Standards for Food has finished its deliberations and its report when published should be of assistance to many local bodies in

framing standards for Indian foodstuffs. In Bengal, a new Municipal Bill designed to extend the power of municipalities was referred on introduction by the Legislative Council, possibly for reasons not directly connected with the Bill. The water-supplies of Calcutta and Bombay are under extension: the latter city has decided to chlorinate its supply. In Madras city there has been considerable difficulty with the filtration of water owing to the production of sulphuretted hydrogen in the filter beds. The Corporation, however, apparently in opposition to the advice of various experts, have decided to continue and extend the present system of slow sand filtration.

"A feature of the year was the severe epidemic of small-pox in Calcutta and parts of Bengal. This outbreak was not unexpected, and followed close on the prediction at the end of 1924 that the increase of cases occurring then indicated an epidemic of severity in the coming spring of 1925. The districts benefited by advice more than Calcutta which suffered severely. The outbreak illustrated the fact that severe small-pox epidemics are apt to recur in India every six years, that the districts of Bengal were better prepared by re-vaccination than Calcutta, and that while on the whole infant vaccination was satisfactory, the greater part of the population are still unprotected by re-vaccination.

"The year 1925 saw a very distinct recrudescence of malaria in Bengal and the neighbouring provinces. The causes in Bengal would appear to have been a series of short monsoons culminating in a very deficient one in 1925. In Bengal the outbreaks would seem to have been a severe recrudescence of the ordinary endemic malaria and not specially due to any widespread malaria of 'pernicious' type.

"The Director of Public Health of Bengal has brought forward some evidence to show that there has been in several districts of Bengal a spread of kala-azar approaching in a few places almost epidemic intensity. Some but not all of these districts border on Assam districts. The endemicity of cholera in the deltaic areas of India, especially in the Gangetic delta has received considerable attention. It is particularly noteworthy that in 1924, the deltaic area of Bengal for the first time in the history of its cholera did not experience severe epidemic conditions, though most other districts of India commonly affected did so. The reasons are perhaps not all ascribable to local effort, but anti-cholera inoculation which has proved so effective in the Philippines and the Far East generally has been accepted by large numbers of the population in the Bengal districts.

"In the matter of sewage disposal, the appearance of the book by Mr. G. Bransby Williams (Chief Engineer, Bengal Public Health Department) on 'Sewage Disposal in the East' has focussed attention on this important problem. The book is noteworthy as advancing particularly the claims of sewage disposal on land even in deltaic areas. The disposal of the sewage of Calcutta and Bombay are difficult problems still awaiting solution."

MADRAS.

Major A. J. H. Russell writes as follows:—

"*Cholera*.—The problems connected with cholera have as in past years received greatest attention. The examination by statistical methods of cholera mortality figures over a long period of years has for long suggested itself as a method which might throw some light on the epidemiology of the disease, and the results obtained in 1924 by such an examination of the figures for Madras Presidency made it desirable to complete the investigation for all other Provinces of India. With help from the Indian Research Fund Association a mathematics graduate was employed, and two papers have already been published, whilst a third is ready to go to press. The two published papers deal with (1) periodicity in the incidence of cholera, and (2) the correlations between cholera on the one hand and climatic factors—rainfall, humidity, temperature and pres-

sure—on the other. These have been worked out for all Provinces of India except Bengal and Assam which will be dealt with separately in the third paper. During the past 30 years cholera seems to have passed over India in long waves with an interval of 6 years between the crests of the waves. The 72 month periodicity has been made evident by the use of Brownlee's method of periodogram analysis. While it is not maintained that there is any inherent permanency in such a periodic trend, yet it is of more than passing interest that this 72-month periodicity has existed all over the Indian continent for over 30 years. This fact may not be of great use in solving the many puzzling problems associated with individual outbreaks of the disease, but it has been of value in Madras in making a plan of campaign for fighting the disease. A confident forecast was made that during 1925 cholera would appear in epidemic form in the Presidency and unfortunately this prediction has proved to be only too true. The Southern Districts area has suffered, and is suffering, severely.

"At the instigation of the Public Health Commissioner with the Government of India, additional investigations in connection with cholera were undertaken. An officer of the Public Health Department is now engaged in carrying out a geographical survey of the Presidency as regards cholera. This necessitates a careful examination of all previous sanitary reports and Sanitary Commissioners' proceedings, as in these many relevant facts relating to cholera epidemics are to be found. Colonel King's reports especially are mines of information. A field investigation into the value of anti-cholera vaccine, and cholera bili-vaccine, and the value of different methods of treatment of cholera cases is also being carried out. A staff of six sub-assistant surgeons working under the direction of District Health Officers has been employed and details of their work are submitted weekly on special forms. It is hoped to collect sufficient statistics in more than one direction to make it worth while analysing the figures and make it possible to draw definite conclusions. The Indian Research Fund Association are financing the whole of this work. It is hoped to carry on similar investigations during 1926, provided the necessary funds are placed at my disposal.

"As regards correlation with weather factors, scores of correlation tables have already been set up and scores of correlation coefficients obtained, but the work is not yet complete. A large part, however, appears in the January 1926 number of the *Indian Journal of Medical Research* to which reference may be made, and it is hoped that 1926 will see this investigation brought to a close.

"*Malaria*.—A number of District Health Officers have made interesting reports on malaria in their districts, but they have as a rule far too much routine work to be able to devote time to special investigations in this direction. However, they do not have the training necessary for carrying out malarial surveys. Malaria is probably responsible for more deaths in Madras Presidency than cholera, small-pox, and plague added together, and the Government has been addressed regarding the importance of the question and the necessity for the appointment of a malariologist. The Malarial Unit attached to the King Institute has been kept constantly employed, by one Government department or another, e.g., Forest, and Public Works Department, but what is now wanted is a malarial bureau for the Presidency with a well trained malariologist in charge. So far, with one or two minor exceptions, no mosquito survey has been carried out in any part of the Presidency. It is not possible to suggest anti-malarial measures until that survey has been made.

"*Vaccination*.—The glycerine lymph now in use all over the Presidency continues to give excellent results. In 1924, over two million persons were vaccinated with a success rate of 94.6 per cent and 1925 will probably register a higher number of vaccination operations and at least on equal degree of success. When it is remembered that only 4 or 5 years ago the success rate was

as low as 59 per cent., the value of Colonel Cunningham's work in the King Institute will be appreciated. The rotary lancet which was adopted in 1924 has been found very satisfactory and vaccinators have appreciated its advantages.

"Teaching of Hygiene.—A visit to the Johns Hopkins School of Hygiene in America and to other schools in Great Britain made it evident that the teaching of hygiene in Madras left much to be desired. The Madras Government have been addressed on the subject, and it is probable that early in 1926 very considerable improvements will be effected, and the different branches included under the term hygiene will be dealt with by teachers especially qualified in these subjects. The two assistant-ships to the Professor of Hygiene which have previously been held by assistant surgeons from the Medical Department are now given to officers of the Public Health Department who have had practical experience in the districts. It is hoped to complete the re-organization of the Hygiene section of the Medical College on those lines during 1926.

"Typhoid fever.—In a number of districts investigation has shown that a very considerable number of 'fever' deaths are due to typhoid infections. In fact several medical officers have reported sharp epidemics of typhoid fever not only in the larger towns but in the smaller villages. The standard of sanitary knowledge being what it is, it is not surprising that these infections should be constantly met with, but they seem to be much more prevalent in some areas than in others, e.g., the West Coast districts of South Kanara and Malabar suffer severely. It is not difficult to suggest measures for combating these types of infection, when protected water supplies are so conspicuous by their absence, when flies breed everywhere and when food supplies are so constantly contaminated. The difficulty is to get one's recommendations carried out.

"Relapsing Fever.—The epidemic of relapsing fever has apparently died out in the plains districts, as no cases have been reported for several months. The infection, however, continues to appear here and there in the Nilgiris and Annamalai Hills among the hill tribes and estate coolies, so that the danger is by no means past. The researches conducted by Col. Cunningham at the King Institute into the spirochetes of relapsing fever and their serological reactions were published in a paper read by Col. Cunningham before the Royal Society of Tropical Medicine and Hygiene in September.

"Hook-worm work.—The Rockefeller Foundation continued their hook-worm campaign in this Presidency during the year. During the absence on furlough of Dr. Kendrick, M.B., of the Rockefeller Foundation, an Indian member of the Madras Public Health Department carried on the work. Surveys have been completed in several districts and the incidence of hook-worm infection is now fairly accurately known for different areas of Madras. In the Ceded Districts the percentage of infection may be as low as 5 to 12 per cent., whilst in several of the wet districts such as those on the West Coast approximately 100 per cent. of the people are infected. The time is now ripe for a further step forward in the campaign. Soil contamination cannot be prevented until the rural population realise the danger of promiscuous defecation and begin to make use of private and public latrines, and unless Government and local bodies can do something shortly in the direction of providing latrines in unions and villages, the Rockefeller Foundation may feel that their expenditure in Madras is not being justified. It would be entirely regrettable if they were to withdraw their co-operation now.

"It is hoped that one or two of the District Health Officers in the Presidency will be awarded Rockefeller Scholarships during the coming year, as it is felt that the wider training they will obtain during the period of study leave in America or Britain will be all to the advantage of the Presidency Health Service. Men with special knowledge of vital statistics and epidemiology are moreover urgently required and those who obtain

scholarships will be expected to specialize in one or other of these branches.

"No addition to the Public Health staffs has been made during 1925, but with the partial remission of the provincial contribution to the Government of India, it is hoped that funds will be available to permit of one or two of the developments which have been already laid before Government for sanction. It is impossible, for example, for a single Health Inspector to control to any effective degree public health activities in a taluk which may be 1,000 square miles in extent. The people are beginning to recognize the value of a trained health staff and as their services are more and more in demand a larger number of Health Inspectors are required. This is only one of the directions in which expansion of the Public Health Department is desirable."

BIHAR AND ORISSA.

Lieutenant-Colonel W. C. Ross contributes the following notes:—

"In January 1925, the second paper by Lieutenant-Colonel W. C. Ross, and Dr. K. N. Bagchi on 'The Seasonal variation in the Reaction and hardness of river water in India' was published in the *Indian Journal of Medical Research*. This completed an investigation into the chemistry of river waters which took more than three years to carry out and which has determined the conditions governing the use of alum, alumino-ferric, etc., in the sedimentation and filtration of water supplies and has worked out the nature and causes of the seasonal variation and reaction in river waters, which was previously unknown and which was the real factor causing all the difficulties in filtration.

"Cholera.—The use of kaolin as a routine treatment for cholera was first introduced in Bihar by Dr. Thompson in the Jharia Coal field. Profiting by his experience, I introduced it on a large scale during the severe cholera epidemic of 1924; and my experience is that kaolin is a very effective remedy when it is promptly used in the early stages of the disease. It has very little value in the later stages.

"I found that kaolin treatment more than halved the death rate, reducing it to between 10 and 20 per cent. according to the circumstances under which it was used, as compared with a mortality which is nearly always over 50 per cent. in untreated cases, and seldom below 30 per cent. with ordinary treatment, such as camphor, opium, essential oils, etc.

"I consider that kaolin is most suitable for general use amongst an ignorant population, as it is not poisonous and can be safely given by anyone with nothing more than the necessary instructions to guide him. Further, kaolin is chemically stable, does not decompose, nor deteriorate and it is cheap and can safely be entrusted to police officers, school masters, patwaris, and other non-medical officials in rural areas.

"The prevalence of epidemic diseases in Bihar and Orissa during 1925 has not been severe. Cholera was epidemic in the district of Purnea and was somewhat prevalent in Orissa and the Patna Divisions. But there was no widespread or severe epidemic.

"The incidence of plague is gradually declining; and malaria although epidemic in Puri and Cuttack has been less prevalent in other parts of the province. The incidence of small-pox during the year increased considerably, but did not attain to epidemic dimensions. The year has therefore been on the whole a healthy one.

"Municipal Sanitation.—The sanitation of municipalities in the province is slowly but surely deteriorating and is likely to culminate in severe epidemics of cholera, plague and enteric fever in many of the towns of the province, unless the administration is made more effective and more efficient. During October there has been a severe epidemic of cholera in Bhagalpur town which is a concrete example of what may be expected throughout the province under existing conditions.

"Health Department.—During the year many districts have put forward schemes for a public health staff organisation, and the schemes have been actually started

in the districts of Darbhanga, Muzaffarpur, Cuttack, Manbhum, and Balasore and are pending in Saran, Patna, Bhagalpur and other districts.

"Reorganisation of the Public Health Department of the province has been arranged during the year and will be introduced early next year. A separate cadre is being provided for the Public Health Department and permanent provision is being made for five School Medical Officers, five Assistant School Medical Officers and ten Epidemic Doctors, who will be employed on epidemic duty when required and will carry out propaganda and investigation work at other times.

"New Public Health Laboratories with ample accommodation and equipment have been provided at Patna during the year, and afforded facilities both for the routine work of chemical analysis of foods and water supplies and for bacteriological investigation work.

"*Vaccination.*—The refrigeration plant at Namkum Vaccine Depot has been duplicated and glycerinated vaccine lymph is now prepared in large quantities and kept in cold storage one year before issue. This Depot is probably the largest one in India and has a maximum output of five million doses of vaccine per annum. The amount issued annually is over three million doses, and a reserve of over two million doses is always kept in stock."

Colonel Ross also notes that there has been a large demand, not only in Bihar and Orissa, but from all over India for the publications of the provincial Public Health Department issued in 1924. These have been reprinted in 1925, and with his letter are enclosed copies of three very useful and simple pamphlets, which we hope to review at a later date. These are a *Mea Manual for Bihar and Orissa*, a pamphlet entitled *Simple instructions for the Prevention of Epidemic Diseases*, and a *Syllabus of Lectures in Hygiene* for school medical officers.

GENERAL.

Dr. J. W. Tomb describes the *public health organisation* in the Asansol Mines' Board of Health area, with its population of some 329,363 souls. The chief epidemic diseases in the settlement are cholera and small-pox. The unit of sanitary administration in the area is the Sanitary Assistant with a circle some 36 square miles in area. There are 13 of such assistants whose duty it is to collect and check vital statistics, verify vital occurrences, submit a weekly report, take immediate steps on the appearance of any epidemic disease, carry out vaccinations, and carry on propaganda work. A system of coloured cards is in vogue for the uneducated *chowkidars*, and a reward of Re. 1 is paid for each case of cholera or small-pox notified. The card has to be delivered by the *chowkidar* to the Sanitary Assistant, or if he is out, placed in a box with a glass front so that it is seen immediately the latter returns home. In connection with small-pox it is hopeless under Indian conditions to attempt the segregation of the patient in his home; a better practice is to vaccinate all contacts immediately. In cholera the essential oils' mixture is freely and widely used. In addition to taking immediate local measures, the Sanitary Assistant must also immediately report the occurrence of the epidemic to headquarters. Epidemics in collieries are dealt with by Sanitary Inspectors on lines similar to those for Sanitary Assistants in rural areas. A special staff of six promoted Sanitary Assistants who have been especially trained in malaria is maintained, also three midwives, and a sub-assistant surgeon for medical inspection of schools. The entire cost of the department under a District Health Officer works out as Rs. 66,220 per annum, or considerably less than one anna per head per annum of the population concerned. At one time this area was a hot-bed of disease, to-day its death rates from cholera, small-pox, intestinal and respiratory diseases are very much lower than those for Calcutta, Howrah and Dacca.

The immense problem of *medical relief for the rural areas* of India has aroused much comment during the

year, and was the subject of our editorial for last May. A very interesting address on the same subject was also given by Major Chopra in Calcutta during the year. This problem is an age-old one, and it will not be solved in a day. It may be true that present-day modern scientific medicine still only reaches one-tenth of the population of India; but what it *does* reach it influences profoundly, as witness the extensive kala-azar survey work and staff's activities in Assam. There are advocates of different so-called solutions of this problem. One authority will urge the extension of medical schools in the *mofussil* and of hospitals and dispensaries, "India is too poor to afford any but really good doctors,"—but such widespread extension is prohibitively expensive. A second school of thought advocates the subsidy by Government of Ayurvedic practitioners in the *mofussil*, to give them a smattering of "western" medicine and place them on an official state register. The writer—at least—can see no point in such a suggestion; if indigenous and Ayurvedic medicine is worth subsidising, its exponents have only got to prove to the general public the value of their methods, and wealthy Indians interested will no doubt come forward to subsidise hospitals and dispensaries run on Ayurvedic lines. A third school of opinion counsels the creation of large numbers of low-grade practitioners of the former "hospital assistant" class, partly subsidised by Government, sent out as missionaries more or less into the *mofussil* areas, and there left to earn a livelihood out of the subsidy plus their own efforts.

The matter is far too vast and too vitally important to deal with within the limits of this review, and for several years it has received the closest attention of the Imperial and Provincial Governments. In reality, huge as the problem is, it is but part of a still more immense problem,—that of the creation of a "public health conscience" in the general population of India. Such a happy solution may appear to be as far distant as the Greek calends, but it is perhaps not so impossible as at first sight it would appear to be. British public health legislation of to-day is the creation of almost less than a century of effort, and a hundred years ago the British public with regard to public health matters was where the Indian public is to-day. In Assam the unceasing work of the kala-azar survey staff has almost created such a "conscience" and there is actually popular support for the work of this staff; elsewhere in India—especially in the plague infected provinces—public opinion within the past 15 years has veered round from almost fanatical opposition to almost cordial support. *Educate, educate, educate*, and the problem may solve itself. At both ends of the scale education is wanted; at one end the creation by post-graduate teaching of the highest possible order of teachers of medicine in the India of to-morrow, so that they will be the equals of any in Europe; at the other, the teaching of the rudiments of personal and public hygiene in an attractive method in primary and secondary schools and colleges throughout India. In two generations of such effort a veritable revolution might be accomplished; indeed much in both directions is already being done.

The importance of the cinema in such work is perhaps overlooked to some extent. One has only to attend any cinema performance in Calcutta or Bombay to see how the Indian masses flock to such performances, to cheer the heroine and hiss the villain. *Panem et circenses* is still the quickest road to popularity in India, as elsewhere. In place of giving such audiences "close-ups" of erotic love dramas and of the activities of cat burglars and other friends of the police, why not at times give them educational films on public health problems, as studied from an Indian and national point of view?

The work in the *mofussil* districts of India of the innumerable mission hospitals deserves nothing but unstinted praise alike from European and Indian, from the interested outside British medico and from the Indian patient. As far as the writer knows—and he has for years at a stretch been in close contact with medical

mission hospitals in India—there is here no disharmony; rather a unique spirit of good-will and progress.

In our issue for last August, Lieutenant-Colonel W. C. Ross comments on the need for a declared *public health policy* for India. Even in Europe preventive medicine—the ideal of the future in which disease will not merely be treated but prevented from occurring—is still in embryo. There are here with regard to India four essential elements. The first is to know the facts; how the different epidemic diseases of India spread and how to prevent them. To a considerable extent we already possess this knowledge. The second is to provide funds, and here organisation is of prime importance. Given accurate knowledge a small sum may be expended on much more useful measures than a much larger sum squandered on measures based upon ignorance. It is in this connection especially that trained epidemiological units are of value. A Finance Department, keen upon retrenchment, may consider that such epidemiological units can be created when the emergency arises. They cannot; unless they are there, trained beforehand and available on the spot, their services will be inefficient. The third essential is organisation and co-ordination, and here a policy of decentralisation with a headquarters for co-ordination and direction of effort is needed; to utilise what money is available to the best advantage. The public health staff needs to be mobile, to be whole-time and to be independent of private medical practice for part of its livelihood. The fourth essential is to arrange between the different departments concerned as to how to procure what is wanted; a strong central organisation, a policy of decentralisation in actual execution, though not freed from responsibility to the central organisation,—and most important of all sufficient funds with which to fight epidemic and preventable disease.

A very striking address during the year was that by Dr. Andrew Balfour, Director of the new London School of Hygiene and Tropical Medicine, on the trend of modern hygiene, published in the *Lancet* for the 9th May 1925, and reviewed in our columns for last October on p. 493; considerations of space here prevent our doing more than merely refer to it.

WATER-SUPPLIES.

Several important papers have appeared during the year. Lieutenant-Colonel W. C. Ross and K. N. Bagchi continue and conclude their studies of the seasonal variation in reaction and hardness of Indian water-supplies with studies of the Ganges and Sone rivers. In April to July the calcium nitrate content shows a great increase, atmospheric conditions in India being extra favourable to the development of free nitric acid during the rains. It is this fact which explains the continuous fertility of the Gaugetic plain, despite its continuous cultivation and inadequate manuring; over $2\frac{1}{2}$ tons of nitric acid are precipitated over each square mile on it per annum.

Major A. D. Stewart and Rao Sahib V. G. Raju deal with the economical use of alum in mechanical filters. Rapid sand filters, when filtering waters which are not turbid but have had some sort of storage previously, reach their maximal filtering efficiency after being fed with coagulated water for an hour only, and the use of alum can thereafter be altogether dispensed with, without in any way impairing that efficiency. A considerable reduction in the expenditure of alum can thus be effected. The second author has also studied the working of slow sand filters in India. At the Hooghly Chinsura waterworks, during June, July and August the results are much inferior to those in other months, and there is a marked increase in non-lactose fermentors. At the Calcutta waterworks the results are even worse. The probable cause of this break-down in efficiency is the deposit of silt as a result of the monsoon flooding of the Hooghly. He suggests that no lactose fermentors in 10 c.c. should be adopted as a satisfactory standard for slow sand filters under Indian conditions. Improvements may be effected by (a) chlorinating the water for the first day or two after periodical scraping

of the top of the sand surface; (b) chlorinating the replenished fresh sand bed at the time of renewal by passing through it for a few hours water containing a slight excess of chlorine; (c) abolition of the arbitrary limits set for loss of head; (d) the chlorination of unfiltered water to suppress algal growth; (e) improvement in the method of storage of raw water. The best method of chlorinating is to combine the alum and bleaching powder in one tank and run the combined solution into the raw water as it falls into the settling tank.

Major H. H. King comments on the stability of solid calcium hypochlorite, with special reference to its use in chlorinating water-supplies and in preparing surgical lotions. Ordinary "bleach" is very unstable under tropical conditions. Stabilised bleach—prepared by the addition of lime—is far more stable; a very dry powder of calcium hypochlorite, dried *in vacuo*, and kept in airtight tins with a washer round the lid, painted with bituminous paint in order to prevent rust, was also found to be very stable. The latter gives very little sediment on solution. He concludes that solid calcium hypochlorite in suitable containers is the most important of disinfectants to be carried with armies on campaigns or during manœuvres.

From the King Institute of Preventive Medicine, Madras, Dr. Turkhud writes:—

"The systematic periodical examinations of protected water-supplies in the Presidency (municipalities, jails, and railway stations), continued and wherever defects were noticed remedial measures were suggested, thereby enabling the authorities responsible for the maintenance of the supplies to keep them in proper order.

"The Madras City water-supply question, which was still pending, in spite of the specific recommendations made by the Committee on Water Filtration, and supported by Lieutenant-Colonel W. W. Clemesha (ret'd.), was again referred to the Director of the King Institute by the Government of Madras. A detailed analysis of samples of water drawn from several representative points of the city water-supply system was conducted and the conclusion reached was that the methods at present in vogue are totally inadequate and that rapid filtration should be resorted to in order to render the water potable.

"As the Corporation of Madras had expressed their disapproval of this system, on the score of expense and of the doubtful improvement that will follow its introduction, it was suggested by the Director, King Institute, that the 3 million gallons of raw water chlorinated imperfectly and mixed with the slow sand filtered supply, should be filtered through rapid filters. Government, accepting this suggestion, have directed that this be carried into effect. They have at the same time turned down the proposal of the Corporation to construct more slow sand filters.

"Research into the best and most economical means of water purification which has been carried out for over 12 years at the experimental filter installation at the King Institute, was continued and the method of filtering slow sand filters with an initial but small dose of alum was found to be a complete success. The method was applied in actual waterworks practice in two municipal supplies with very satisfactory results. Experiments on percolating filters are now in progress. Government have now ordered the retention of the experimental filter installation on a permanent basis.

"The bacteriology of water-supplies continued to be the subject of special study by Mr. T. N. S. Raghavachari during the year. The lactose fermenters found in several samples of the soil, animal faeces, milk and water were examined with reference to their fermentative and other biochemical reactions. The results obtained by him resemble those of the American bacteriologists, except in certain minor details.

"Mr. Raghavachari has also been engaged in the application of the citrate utilization test of Koser to the lactose fermenters isolated from water-supplies in this Presidency. He reports that this test marks a

distinct step forward in the classification of lactose fermenters, in that by this test the truly faecal can be sharply separated out from those that are derived from non-faecal sources.

"A systematic investigation into a very interesting case of a deep well supply becoming unfit for drinking purposes as a result of manganese troubles, with the consequent necessity for finding another suitable source of supply for an emigrant population, was undertaken by Dr. Turkhud and Mr. Raghavachari. A deep bore-hole about 300 yards away from the well revealed the presence of phenomenally high figures for free ammonia, besides containing manganese in solution. The occurrence of manganese in water-supplies has not been recorded hitherto in this Presidency. The possibility of troublesome growths occurring in the pipe line when a water containing manganese and excess of organic matter was passed through it necessitated the institution of experiments for demanganising the water. These are in progress and so far as they go are promising of good results."

FOOD SUPPLIES.

Mr. Hawley, Public Analyst with the Government of Madras, completed an extensive analytical study of standards suitable for adoption in that Presidency for milk and butter supplies, and his recommendations were submitted to Government. In the *Indian Medical Record* S. N. De comments on the serious question of infected ice cream in India. The methylene blue reduction test was applied to a large number of samples taken from various sources in Calcutta. If the methylene blue solution be decolourised in 20 minutes it means that the ice cream contains 20 million or more bacteria per c.c. Further evidence as to contamination can be obtained by culturing for faecal bacteria. The milk may be severely contaminated although without odour. All samples of *kulpi baraf* which give a positive methylene blue reaction should be rejected; on the other hand it does not follow that a negative reaction always means that the ice cream is wholesome.

RABIES.

This disease may perhaps be most suitably considered under this section. Lieutenant E. C. R. Fox, I.M.D., Superintendent of the Bengal Pasteur Institute, writes as follows:—

"Two papers were published during the year, both by Lieutenant-Colonel J. W. Cornwall, in the *Indian Journal of Medical Research*. The first deals with the estimation of the blood-sugar in normal rabbits and in rabbits inoculated intracranially with rabies fixed virus. It was shewn that the blood-sugar rises slightly after inoculation; drops a little about the 4th day, and on the 6th and 7th days there is marked hyperglycaemia. The second paper deals with Negri bodies. The author feels assured that the majority of these bodies and the corpuscles seen in the large nerve cells are the expression of the intracellular growth of the specific organism of rabies. Spores of the organism in the nerve cells mature, ripen and burst, and the contained corpuscles emerge into the cell protoplasm.

"Reports published during the year shew a general increase in the number of patients seeking treatment at antirabic centres. Two new such centres were opened during the year, one at Nagpur, and one at Lahore. The Kasauli Institute in 1924 treated 7,852 patients, this being the highest number on record. The Director remarks—"The fact of such an increase being possible tends to show the existence of a large untreated population at risk from rabid—or supposedly rabid—animal bites. . . . It is possible that opening of local centres would better tap such a population and so extend the benefits of antirabic treatment."

"Experiments are being carried on in Kasauli and Rangoon as to the effect of heat on the potency of antirabic vaccine. The results have not yet been published."

MISCELLANEA.

The medical examination of school children is now an important part of the public health programme of all the provinces of India. J. N. Maitra records the results of examination of students at the Presidency College, Calcutta. The results are bad, to say the least of it; on the whole 80 per cent. of students were found to be defective physically in one or other respect. Only 6 per cent shewed good muscular development; 37 per cent stooped; 39 per cent. had defective vision; 24 per cent shewed defective or carious teeth.

From Bombay, Dr. S. N. Goré records the results of investigations into fumigation by calcium cyanide. Its use for the generation of HCN gas is both simpler and more convenient than the use of sulphuric acid with sodium or potassium cyanide. Mere exposure of calcium cyanide to air results in evolution of most of its HCN gas in 1½ hours. One oz. of calcium cyanide per 100 c. ft. gives a lethal concentration in air-tight spaces, attained in 1½ hours and maintained for about 4 hours. When used in the open, however, a lethal concentration is not obtained. Diffusion of HCN gas from calcium cyanide in narrow channels, dug in the ground, is too poor to be effective.

Major A. D. Stewart and N. L. Bannerjee describe the commercial preparation of a neutral soft soap, cheap and practically inodorous, from fish oil by running the oil into an excess of KOH lye gradually, and diluting, boiling the mixture, and subsequently blowing air through it. Excess of alkali in the soap can be easily neutralised by adding a 28 per cent. solution of ammonium chloride in excess of the theoretical amount.

SEWAGE DISPOSAL.

Dr. Turkhud writes:—

"The Committee on water purification was ordered by Government to carry out experiments on the problem of sewage disposal. The necessary staff having been provided, experiments have already been projected. The sewage disposal plant on which the first set of experiments has been undertaken consists of septic and Imhoff tanks, percolating and contact beds. Other types of plants in the city of Madras will also be taken up as soon as possible. This enquiry, which is perhaps the first systematic one of its kind in this country, should yield a considerable amount of useful material of great help to sanitations.

"Testing of disinfectants.—The time-honoured Rideal Walker test for the determination of carbolic coefficients of disinfectants was found in this Institute to yield invariably much lower figures than those claimed by the manufacturers on the strength of tests carried out in English laboratories. Last year, the local agents of a well-known brand of disinfectant, acting on the advice of their principals in England, submitted a sample of their product. Our tests yielded a figure which was far below that by the English laboratory test. The manufacturers ventured to suggest in a lengthy communication to the Director, King Institute, Guindy, several reasons for the low figures given, among which it was stated the Rideal Walker test has been practically superseded in England by the British Admiralty test and that in the latter test considerable importance was attached to the use of particular strains of *B. typhosus*. A detailed investigation into the merits of these suggestions was undertaken and numerous tests have been carried out by Messrs. T. N. S. Raghavachari and P. V. Sitaram, acting in collaboration with Mr. Hawley, the Public Analyst.

"The conclusions arrived at point to the following facts:—

- (i) The British Admiralty test, which furnishes conditions similar to those occurring in nature, yields a lower figure than the standard Rideal Walker test.
- (ii) The Rideal Walker test yields figures which are generally about 50 per cent less than those claimed by the manufacturers.

Hopkins, Rawling and Chapman do not appear to accept the results of either the Rideal Walker or British

Admiralty test. The King Institute strain does not therefore account in any way for the low figures obtained. From a published paper issued by the Royal Institute of Public Health, London, it is found that the same samples of disinfectants sent out to various laboratories in the world, have yielded results which vary within the wide limits of 114 to 183 per cent."

OBSTETRICS, GYNÆCOLOGY, INFANT WELFARE.

Despite the lengthy review of recent progress in these subjects in our issue for last month by Major V. B. Green-Armytage, a number of papers published during the year by workers in India call for review.

Priority of place must certainly be given to the paper by Miss G. Stapleton, M.B., W.M.S., published in our December issue, on *pelvic measurements in Indian women*. These measurements were determined on 200 Indian women at the Dufferin Hospital, Agra, at the 8th to 10th day after delivery. She concludes as follows:—

"1. The average external pelvic measurements of Indian women in the Agra district, excluding those with abnormally small pelvis, are:—

(a) Inter-spinal diameter, 8½"; inter-cristal under 9½"; external conjugate, 7½".

(b) The diagonal-conjugate is on the average 4½".

(c) The average weight of the babies at birth was 6 lbs.

(d) Slight grades of flat pelvis are found apart from and history of osteomalacia or rickets."

The same author contributes a striking analysis of 72 cases of late rickets and osteomalacia seen at the Lady Hardinge Hospital, Delhi, during the period 1921-24. Eighty per cent of these were associated with *purdah* life. There is no sharp dividing line between late rickets and osteomalacia, and intermediate cases are seen with characteristic symptoms of both diseases. The difference in symptomatology of the two diseases appears to be due to conditions in the tissues, largely dependent upon the age of the patient. The determining causes in the majority of patients are the *purdah* system, i.e., absence of sunlight, of fresh air, and of exercise. The diseases usually commence about puberty or in early adult life. Osteomalacia is not uncommon in young Indian women, quite apart from pregnancy. Tetany frequently occurs in the course of osteomalacia, and this suggests some close relationship between the metabolic disturbances that give rise to tetany and to osteomalacia respectively. These conclusions, based upon the observations of patients at Delhi, closely agree with those for patients seen at Nasik by Dr. Stapleton and the late Major Hutchinson.

Lieutenant-Colonel C. C. Murison comments on the midwife in Indian practice. The common Indian *dhai* is responsible for a revolting septic technique and appalling maternal and infantile mortality. The increase of special maternity hospitals in India has been slow; at Belgaum civil hospital accommodation was steadily extended, and the number of such cases rose from 8 in 1910 to 131 in 1924. He suggests compulsory registration of all *dhais*, making them attend compulsorily an elementary course of instruction at hospital of a month or more; registering them, and appointing them to *mofussil* hospitals and dispensaries.

An investigation into the bacteriology of *puerperal fever* was conducted by the workers at the King Institute, Guindy, Madras, at the Government Maternity Hospital, Madras, during the year. Many of these cases had followed instrumental delivery. Out of a total of 88 patients bacteriologically examined, streptococci were detected in the vagina of 36, and in the uterine cavity in 29 patients. Of the 36 strains isolated from the vagina, 29 were hæmolytic, and 7 non-hæmolytic. Of the 29 strains from the uterus 27 were hæmolytic. It is hoped that the results of this investigation will be

published in due course. *Streptococcus subacidus* appears to be the prevalent type (adopting Holman's method of differentiation and classification).

B. B. Bhattacharya describes the histo-pathology of eclampsia in an illustrated article. Liver sections from fatal cases shew periportal necrosis and hæmorrhage. Other sections from cases of the pernicious vomiting of pregnancy shew central necrosis of the lobules. He dwells upon the great need for ante-natal clinics in India.

Of general obstetric cases, a number have been recorded of special interest in different journals. D. Pereira advocates calcium lactate administered during pregnancy to prevent still-births. Dr. H. G. Roberts of Shillong records a case of post-mortem Cæsarian section; the mother who was suffering from eclampsia died on the operation table before operation was commenced, but a live fœtus was delivered and survived. Lieutenant-Colonel P. S. Mills records an extraordinary case of extra-uterine gestation in the left Fallopian tube and broad ligament, going on to full term. At laparotomy a living child was delivered and the mother made an un-interrupted recovery. She was a *gwalla* by caste, aged 20, and in her first pregnancy. The fœtal sac was free from adhesions, and the placental site lay almost wholly within the tube. The operation was thus straightforward. R. N. Kundu records a case of spontaneous inversion of the uterus following delivery and precipitate labour. The patient was found sitting on the floor and bleeding profusely. The inverted uterus was replaced by pressure with the hand covered with a gauze pad. Hot intrauterine douches were given, injections of ergot, and 20 c.c. of anti-streptococcal serum. The patient recovered.

S. Serlachar records a case of what was apparently pulmonary embolism following the administration intravenously of 1 c.c. of pituitrin on the 7th day of the puerperium, apparently due to dislodging of clot and embolus formation. Y. S. Row comments on such cases; the intravenous use of pituitrin causes a sudden rise of blood pressure, constriction of the coronary arteries and a slow heart beat. If pituitrin is to be given intravenously at all—and not hypodermically—it should be given well diluted with normal or hypertonic saline solution.

Gynæcological Cases.—Several such individual cases deserve mention. Cases of large or enormous ovarian tumours are recorded by S. C. Das Gupta, who records two cases; by Rai Sahib C. Nath who records ovariotomy on a tumour weighing 24½ lbs.; and by B. S. Rao. The last mentioned author records a case of large ovarian tumour which developed during pregnancy. Labour was normal and ovariotomy was performed a month later; 1½ bucketfuls of fluid were withdrawn from the ovarian cyst before its removal. I. B. Basu records a case of malignant tumour of the ovary together with pregnancy in a Nepalese girl aged 15, with marked œdema and ascites. Operation shewed a malignant tumour of the right ovary the size of a football. After removal of the tumour labour ensued at the eighth month of pregnancy, two months after the ovariotomy. The child was still-born, and the mother died 48 hours later with ascites, œdema of the subcutaneous tissues and œdema of the lungs.

J. M. Das describes a case of congenital absence of the vagina in a Hindu girl of 16, accompanied by bilateral hæmatosalpinx.

Infant Feeding.—Major E. H. Vere Hodge draws attention to some points in artificial feeding. "Take a child off the breast prematurely, and his troubles begin." The normal acid barrier of the stomach may be interfered with and most artificial foods contain too little lecithin. Purchased milk in India is quite unsuitable, and a private cow should be kept; it must be healthy and fed upon fresh as well as upon dried fodder. Cows in the plains are not satisfactory during the hot weather. The newly introduced desiccated cow's milk may be a possible substitute. It contains vitamins A and B in sufficient quantity, but C is absent, and cod-liver oil, fruit juice,

or P. D. & Co.'s "Metagen" should be used to supplement it. Dried milk is often better and more wholesome than milk from an inefficient cow in the plains of India during the hot weather; whilst proprietary foods are more often misused than not.

Major V. B. Green-Armytage considers drugs almost useless in infantile diarrhoea. The mother's nipples should be cleansed carefully before and after each feed, and three-hourly feeds given, each of seven minutes' duration. Five grains of sodium bicarbonate should be given in 1 oz. of water before each feed. The mother must avoid constipation and drink a tumblerful of water before each feed. Hot and cold sponging and massage of the breasts should be carried out, and the infant weighed daily. Warm enemata are the best line of treatment for an infant passing grey, slimy stools; 2 to 5 minims of tincture camphore co. for green lenteria. If the mother cannot feed the child, cow's or goat's milk should be given, but in the vast majority of cases it is a mistake to take the infant off the breast. Patent foods he condemns absolutely.

Child Welfare.—In a very striking address, published in the *Indian Medical Record* for last March, Dr. P. Ganguli outlines "our duty towards the future generation in India." Puerperal tetanus is so common in Bengal that it is attributed to the visitation of a ghost—the *pencha*. It is estimated that 30,000 infants a year die from this preventable disease in Bengal, out of a general child mortality of some 250,000 a year, again most of it preventable. After tetanus come diarrhoea and dysentery as great causes of infantile deaths. The author writes:—"There should be no winking at some perilous customs prevalent amongst the Hindus...untouchability of the mother for two to three weeks after confinement, the selection of the worst, damp, ill-ventilated and dark room of the house for confinement, the use of old dirty beddings." Maternity and child-welfare are immensely urgent problems in India; in England during the war women of the highest and noblest rank were content to enter hospitals for the wounded and to carry out the meanest of tasks; in India it is almost impossible to get Hindu or Mahomedan girls of any status at all to train as nurses. Maternity homes should be started in every centre of population in the land, and be run by subsidised trained Indian nurses; only in some such way can maternity-welfare become a reality in India, and not merely a pious hope. Further, the milk supply is becoming a most urgent problem all over India. The cattle of Bengal, at least, are undernourished, their fodder deficient in vitamins, their milk yield miserably poor. Further, in a Bengali household the young mother is the most neglected member of the family and what milk is available is taken by the male members of the household. "We Bengalis are a dying race...In ignorance of the first principles of health, we delegate our womenfolk to an inferior status in the household. The barbarous custom practised in the name of religion which makes mothers untouchable for 2 to 3 weeks after confinement, colossal ignorance of the first principles of the dietary of children, neglect of the mother after delivery, all these are contributory factors. Yet rich people will hesitate to spend Rs. 20 or Rs. 30 on a confinement, who will not hesitate to spend Rs. 1,000 on celebrating the *annaprasna* ceremony of the child." Finally it is up to the young Indian doctor to preach in season and out of season the need for proper maternity and child-welfare.

The same lessons are taught in a similar article by Ashutosh Roy of Hazaribagh, a well known senior Indian physician; and in still other articles. In the meantime the success of Baby Week all over India shews that the matter has at last aroused interest.

OPHTHALMOLOGY.

The following review for the year is very kindly contributed by Major R. E. Wright of Madras:—

"The Convention of English-Speaking Ophthalmologists was held in London in the month of July. It had

not been found possible to arrange an international gathering. The last congress was held in London in 1872. It was intended to hold an international congress in 1914, but war broke out. The Minister of Health drew attention to the fact that ophthalmic service, restricted to the well-to-do 50 years ago, was now within the reach of all. It was particularly organised for children, and in England there were 500 medical men and 482 clinics specially for this purpose, and a further extension was provided by ophthalmic benefits under the National Health Insurance.

"Sir J. Parsons delivered the Bowman lecture on 'The foundation of vision' and ended on a note that should be carefully weighed by all Indian ophthalmologists. He says 'future advances' (in ophthalmology) 'will not depend, as heretofore, on refinements of operative technique, but will rather depend on and be revolutionised by an increased knowledge of the bio-chemistry of the eye and the physiology of vision.' It is well to remember that we, Indian ophthalmologists, are often regarded in the outside world as 'cataract punchers' and we should try to act on his forecast.

"Indian literature has not been very rich in papers dealing with ophthalmological subjects in the past year and does not reflect the actual amount of work going on. Certain subjects have been published by Indian eye workers in ophthalmic journals, whilst visitors to the east and the overseas tours of our own ophthalmologists have brought current work in this country before the profession. Dr. H. T. Holland gave his views on important aspects of cataract work to several American meetings.

"Major Acton's work on epidemic dropsy is of interest in India where glaucoma is so prevalent. The association of a definite type of glaucoma with epidemic dropsy has been established by Maynard (1909) and Coppinger. The correlation suggests that it is determined by the same factors. Acton considers that epidemic dropsy 'is a toxic syndrome caused by the ingestion of poisonous bases formed in rice under certain conditions, although similar poisons can be formed in other foods under storage.'

"The operative treatment of cataract as usual, received a large share of attention (almost an unfair share, as cataract is by no means the most important cause of our preventable blindness).

"Capt. M. M. Cruickshank publishes details of 115 cases of phacocresis, and touches on the after effects on the vitreous of removing the capsule. These he does not regard as of very great import. Concerning recent changes in the vitreous he confines himself to fine threads or fibres in the pupil and fine dust-like pigmentary deposits seen with the loupe. Such changes in his series were less prevalent than in eyes operated on by other methods (presumably intra-capsular). He refers to the difficulty of interpreting changes in the anterior layers of the vitreous or hyaloid membrane with relation to the influence of trauma. Experienced slit lamp workers would agree with this provided the changes are within the limits dealt with by Cruickshank; but certain abnormal post-operative opacities are easily differentiated from the various normal varieties. In the writer's opinion neither the loupe nor the corneal microscope is the most practical way of determining vitreous opacities of the variety that the patient is concerned with but rather a good type electric ophthalmoscope. The origin of non-cellular vitreous opacities including the streamers seen after vitreous escapes, is a difficult study and should be checked in the laboratory. There seems to be a confusion of ideas where the author speaks of the cells of the posterior capsule, and some of the references are difficult of verification. The remainder of the paper analyses a good series of 115 apparently unselected phacocresis cases. The apparatus used is noteworthy in affording varying pressures and portability, without requiring electricity. The iris prolapse rate of 3 in 100 is average good. To Barraquer is attributed an iris prolapse rate of 0.4 per cent.

attained by adopting peripheral iridectomy and suturing the section. This figure is difficult for us to understand in India and must be the envy of all operators with large experience. The author regards iris prolapse as the worst of complications and considers 'speed' in technique pre-eminently to blame. It is doubtful whether this opinion would meet with general acceptance. Most of the 'big' operators in India have varied enormously in speed and knife movements, yet there does not appear to be a vast difference in their iris prolapse rate. The tumbling of the lens and the conducting of the final stages of delivery so that the iris is not disturbed from the hyaloid membrane, referred to by the author, may largely explain Barraquer's prolapse rate.

"The same author contributes an article on 'Choroidal hemorrhage following cataract extraction', which includes notes on other sequelae such as the drawn-up or boat-shaped pupil and striate keratitis. Working in Holland's clinic, where, he remarks, the incidence of glaucoma is very high, he collected 30 cases of choroidal hemorrhage in 2,777 extractions. Holland advises extraction with capsulotomy where the tonometer registers more than 42 mm. of Hg. (McLean). This is certainly a careful figure, the normal for McLean's instrument being 22 to 40. Where the tension is over 50 a preliminary iridectomy is advised and extraction postponed. Routine use of the tonometer reduced choroidal hemorrhage to 1 case in 1923 and 3 cases in 1924. It is not clear from the text whether a distinction is made between glaucoma secondary to cataract, cataract secondary to glaucoma, or cataract appearing as in accidental complication of glaucoma. In operating for cataract it is of vital importance to determine the tension or a predisposition to it and it is pleasing to see an author stressing one of the most important of the large group of outside influences (as distinguished from the purely technical) which determines failure or success. The author discusses the drawn-up pupil so frequently seen after both 'expression' and 'capsulotomy.' Advocates of 'capsulotomy' would consider the boat-shaped pupil rare, unless the suspensory ligament has ruptured. The writer considers that the typical boat-shaped pupil is met with in cases where the vitreous is in contact with the iris. The drawn-up pupil of capsulotomy is most often due to forward displacement; that associated with 'expression' to inversion or recession. The author seeks an explanation of the way in which the drawn-up pupil continues to become more and more up drawn. The phenomenon is probably for the most part due to the progressive contraction of fibrous elements, associated with the processes of repair.

"Dr. J. Macphail writes a very interesting paper on 17,000 cataract extractions performed by him in the past 34 years at Bamdah Mission Hospital. From small beginnings the number gradually increased and in 1924 rose to 1,440. Numerous other eye operations are performed. His long and extensive experience makes his opinions of considerable value. The capsulotomy method is mostly employed, but he considers the Smith operation when successful a beautiful one and especially indicated in immature cases. Primary capsule rupture with the knife was adopted from Pope in Madras (where Drake Brockman introduced it in 1879 and it is still done, but with the needle). Irrigation is not employed, Pagenstecher's lens expressor being used to remove debris. A preliminary iridectomy is considered best in cases of high tension and if time were no object Dr. Macphail would do preliminary iridectomy in any case as it is safer. He has a lively sense of the danger of glaucoma and considers inactive pupil almost as important as a tonometer reading. An observer of Dr. Macphail's experience must also attach great value to the depth of the anterior chamber, the diameter of the cornea, and iris pigment disturbance. The writer considers that tonometers are of doubtful value in slight deviations from normal unless the observer and instrument are constants. The instruments of Schiotz,

McLean and Baillart give widely different readings in mm. of Hg. and obviously cannot represent in mm. of Hg. the intra-ocular pressure. In tension cases he considers preliminary iridectomy essential, and in the vast majority of other cases desirable. Like many operators in India he considers that the Indian patient behaves well on the table. There seems to be a widely prevalent idea that the Indian patient is quieter at the time of operation than the European. (This has not been the writer's experience.) Macphail considers (as do most others) that the Indian hospital patient is very difficult to manage after operation. It is interesting that he believes the main cause of cataract is glare and it would be instructive if he could produce figures to support the opinion that most cataract cases come from the hot dry regions and relatively few from the moister cooler districts. Without figures it is impossible to discuss this aetiological hypothesis.

"Like most mission hospitals in India the Bamdah Mission does magnificent work at a ridiculously small cost, the expenditure in 1923 being Rs. 3,600.

"Wright describes a method of adopting a paraffin artificial eye to a normal or reconstructed socket. In India it is difficult to fit patients with suitable double shell glass eyes, but one can model the exact size required in hard paraffin and then make a plaster mould, and cast several of like size and shape. The patient wears one, whilst another is sent away to be copied, details of colour, size and position of cornea (relation to the lid margin), and diameter of pupil being supplied to the manufacturers.

"Wright and Taylor contribute an article on *orbital cellulitis* which contains a number of practical points on treatment. In their opinion the diagnosis and treatment of the condition is not sufficiently appreciated and they have seen 'both eyes and lives lost through ignorance' of how to deal with such cases. The subject is not dealt with very well in the ordinary text books and their experience may be helpful to others.

"Wright publishes elsewhere an interesting case of optic neuritis in sphenoidal sinus disease, and describes a method of determining the outline of the sphenoidal cells by bismuth packing and x-rays. He records a cyst of the iris successfully treated by means of aspiration and subsequent filling with pure carbolic (which is finally removed) so as to destroy the lining cells. A good result in such cases is very rare and the technique described is new although similar methods have been used. The patient's eye was quiet a year after operation. He describes a case of Parinaud's syndrome in which the histo-pathological appearances suggested a conjunctival infection with Verhoeff's streptothrix, but Verhoeff, from examination of some of the material sent to him, did not confirm the type. He also contributes cases of amyloid degeneration of the conjunctiva; orbital growths of doubtful nature with detailed histo-pathology; and a rare bilateral congenital malformation of the cornea and conjunctiva (in which the bulbar conjunctiva had remained as embryonic skin).

"In the 1924 report of the *Government Ophthalmic Hospital, Madras*, Major Wright reviews 1,493 cataract operations. The vitreous loss rate, 0.2 per cent. approximately in a series of over 500 selected for peripheral iridectomy, is low. Compared with a series of nearly 800 cases with complete iridectomy and a vitreous loss rate of approximately 2 per cent., it indicates what can be done by selecting cases. Iris prolapse or impaction was met with in 6 per cent. The difficulty of recording results so as to give an absolutely clear idea of complications is mentioned. 'The only satisfactory way is to see patients after a year or so.' The difficulty of dilating deeply pigmented eyes is discussed with local causes and the possible influence of hypoadrenia. The tendency in Madras is towards complete iridectomy in 'doubtful' eyes, peripheral iridectomy in average good eyes, and a 'simple' in cases with light coloured irides of good tone (otherwise uncomplicated). Trephining for glaucoma was done in 112 cases and is still the operation of choice. Large numbers of glaucoma

cases in advanced stages are seen and these give the impression of important physical changes in the vitreous. The refraction department dealt with 2,644 cases out of which 356 fundus cases were of sufficient interest to merit special record. More than 50 per cent. had syphilis and arterio-sclerosis was present in approximately 12 per cent. The out-patient department showed high figures for certain conditions of serious prognosis for sight: trachoma 803, phlyctenular conjunctivitis 703, ulcus serpens 112, gonorrhoeal ophthalmia 79, keratomalacia 63 and panophthalmitis 98 (chiefly due to small-pox, gonorrhoea, keratomalacia, ulcus serpens and indigenous treatment for conjunctivitis).

Items of special interest and records of special cases are dealt with by the Superintendent and staff of the hospital. A bacteriological investigation of hypopyon ulcer in 75 cases with special reference to the pneumococcus was carried out in co-operation with Lieutenant-Colonel J. Cunningham, Director, King Institute, Guindy. The results showed that 28 of these were infected with the pneumococcus:—type I = 1, type II = 2, type III = 3, and type IV = 22. It was not anticipated that so many would fall into group IV. The investigation was designed to discover the frequency with which the different groups of pneumococci were present and to establish, if practicable, a method of treating ulcus serpens with high titre serum. The serum is at present under test. Iridocyclitis was performed in 10 cases at Colonel Herbert's request. The patients did well but the procedure did not show any advantages over trephining. In co-operation with Lieutenant-Colonel Cunningham, experimental work on trachoma was carried out. It was found impossible to infect the conjunctiva of *Macacus sinicus* with trachoma material, and rabbits inoculated subdurally gave a negative result. Sympathetic ophthalmia appears to be relatively infrequent in Madras. Dr. K. Koman Nayar maintained a record of 62 patients who would ordinarily be considered liable to sympathetic ophthalmia, but not a single case of infection has been traced. An interesting series of tape-worm cysts directly or indirectly affecting the eye or orbit is given. In one case the cysticercus was situated in the pupil and was easily removed through a keratome incision. The little bladder worm on extraction was about 3×5 mm. and whilst under observation in warm saline with a binocular microscope, it was observed to protrude its head and make movements of the rostellum. The specimen sent to the Royal Veterinary College, London, was identified as *cysticercus cellulosa*. A comprehensive series of cases illustrating different varieties of proptosis as met with in the out-patient department is listed by Mr. Kandaswami Pillai. It is noted that no case of Grave's disease was seen in the last 100,000 out-patients. One man showed the 'sun gazers' macular injury described by Kirkpatrick and the damage was found to be due to looking at a heliotrope through a theodolite. A number of cases of simple optic atrophy associated with syphilis without evidence of other systemic nervous system disease has been observed. Tabes with simple optic atrophy is rare. In the year under report, 8 cases of simple optic atrophy in which syphilis was definitely proved showed no other symptoms except (in some) an exaggeration of the knee jerk. It is considered that such cases represent a syndrome of relatively frequent occurrence. Epithelioma associated with extensive freckling in a young boy similar to that described by Hutchinson as lentigo maligna juvenilis is described and illustrated and a microphotograph shown. Other matters of interest are referred to in the report.

"Animal experiments carried out by Major Wright for Messrs. Collins and Mayou in connection with an investigation by them on siderosis were financed by the S. I. branch of the B. M. A.

"In losing Major Craggs, L.M.D., (for 17 years associated with the Government Ophthalmic Hospital) who has taken long leave prior to retirement, Madras loses an ophthalmologist who has done yeoman service to

promote the highest ideals of this science in South India. His contributions to ophthalmic literature date back to 1912.

"Lieutenant-Colonel Henry Smith (retd.) pleads for research in the treatment of *squint*. He suggests treatment of the lengthened muscles in non-paralytic cases by electrical stimulation and draws analogy between the treatment of eye muscles and that which is adopted for shortening, and lengthening of skeletal muscles. He quotes one case in support where an external squint of 30° was apparently cured by faradisation of the faulty rectus.

"Apart from the publications of workers in India, the outstanding features of the year may be briefly alluded to. Uribe Troncoso has almost perfected the *gonioscope* which by means of a corneal contact glass enables one to make a detailed examination of the filtration angle and the root of the iris and outer third of the anterior face of the ciliary body. The use of this instrument will be essential in large clinics, more especially in examination of preglaucomatous eyes.

"The exceedingly valuable work of Sir A. Lawson on *tints* and their values at last gives the Indian ophthalmologist something definite to work on. Crookes B₂, Ficusal, and Peacock blue all give a wide margin of protection against rays beyond either end of the visible spectrum and yet allow enough white light through for practical outdoor use in India. The ophthalmologist must use discretion in selection and it is not always desirable to use such deeply tinted glasses as the above. Unless patients feel the glare it is not considered necessary by the majority of experienced workers for normal persons to wear highly protective glasses, but with uveal or retinal disease, lenticular trouble or aphakia, it is nearly always desirable to order protective tints.

"Lindner's work on the phagocytosis of parasitic micro-organisms by the *conjunctival epithelium* is of the greatest importance and interest, and his method must form part of the routine technique of every up-to-date ophthalmic clinic. By making epithelial smears by Lindner's method one is frequently able to make a diagnosis before smears of conjunctival secretion are available, and when secretion smears give negative results an epithelial scraping is often positive. The idea that particular organisms were phagocysted by the conjunctival epithelial cells is not new, being noted by McKee in 1912, but Lindner in 1921 was probably the first to realise that the phenomenon was one of active phagocytosis.

"The Council of British Ophthalmologists published its annual report for 1924-25. Since its inception in 1918, this body has directed its activities into the most important channels in connection with ophthalmic education, standardisation of methods used in refraction testing, control of contagious disease, and questions of state on which expert ophthalmic opinion is necessary. The Council has published a series of valuable reports which have appeared in the *British Journal of Ophthalmology*.

"The Anti-Trachoma League, founded in 1923 at the Pasteur Institute, has directed attention to the importance of controlling the scourge. Since April 1, 1924, trachoma has become a notifiable disease in France. The need in India for some action on the part of the State in connection with the great groups of preventable eye diseases is obvious, but to expect the need to be officially met at a time when the existing medical machinery is being drastically axed is perhaps too much.

"*Papilloedema* has attracted much attention during the past year. In many cases surgeons are shy of doing decompression in time. In papilloedema of doubtful origin a subtemporal decompression in the early stages is indicated. From the ophthalmologist's point of view late operation is worthless, for even if it prolongs life and gives temporary relief, the nerve fibres suffer total strangulation as the result of late cicatricial changes. That marked papilloedema is compatible with perfect central vision seems to be a stumbling block to surgical

judgment. Localising symptoms of brain tumours excepting headache are most frequently conspicuous by their absence and when such causes of papilloedema as brain abscess, sinus infection, meningitis, nephritis, and diffuse intracranial syphilis are excluded there is little left to choose from. That we may have an appearance indistinguishable from papilloedema is familiar to every ophthalmologist of experience, but with papillitis, and optic neuritis with oedema, the vision and fields are, as a rule, disturbed early. Pseudoneuritis (as in high hypermetropia) is perhaps the most difficult appearance to contend with in differential diagnosis.

"New observations and investigations with the *corneal microscope and slit lamp* constitute a feature of the year's ophthalmic literature. Of English ophthalmologists, Graves is the only one who has advanced our knowledge in this branch and kept pace with continental workers."

In addition to Major Wright's review, Dr. H. T. Holland writes from Quetta as follows:—

"As I have been away on leave, I have not much to contribute, but I would refer to a modification of Smith's method, of which we did over 600 cases. Instead of a complete iridectomy, a peripheral iridectomy was performed. This is a very great advantage from the cosmetic effect, as there is a central pupil, instead of the U or boat shaped pupil to which exception is taken. This operation when successfully performed is almost ideal; the lens is delivered without any difficulty. There is however one drawback. Should vitreous present or the capsule be ruptured or the lens be dislocated backwards, it is difficult to introduce the vectis or spoon where a complete iridectomy has not been performed. In such cases the iridectomy has to be made complete, the vectis or spoon is then introduced, and the lens extracted with the spoon according to the Smith technique."

Attention may also perhaps be called to an interesting paper by Lieutenant-Colonel R. H. Elliot, (retd.), on *conjunctivitis in the tropics*. In epidemic form a great variety of micro-organisms is encountered, and the epidemic seems to be made up of a series of sub-epidemics, each with its own rise and fall. Secondly should be noted the curious seasonal regularity with which such epidemics repeat themselves each year. With regard to gonococcal conjunctivitis, the tropical form is usually contracted from conjunctival and not from genital infection, and is frequently sub-acute or chronic, with definite seasonal variations. It may become epidemic when the temperature rises, and in India and China is especially prevalent in July to September. The disease is on the whole far less virulent in the tropics than in Europe. During a severe epidemic in Samoa, Hunt implanted the virus from the eye on to healthy conjunctivae, the male urethra, and the vagina. Membranous conjunctivitis, rare in Europe, is common in the tropics. It is due to the Klebs-Loeffler bacillus, but may also be caused by staphylococci, streptococci, pneumococci, gonococci, or the Koch Weeks' bacillus. Sometimes small limited epidemics occur. Infection is spread by direct contact, flies, diphtheria carriers, and dust, and the disease is not infrequently contracted in out-patient departments. It is unilateral or bilateral; ocular paresis may occur; corneal ulcer ensues in some 63 per cent of cases. The treatment should consist of segregation and keeping away flies, antidiphtheritic serum, a eusol lotion and application of 2 per cent. silver nitrate to the lids.

The definite occurrence of swimming bath conjunctivitis shews that conjunctivitis may follow bathing in the contaminated waters of the tropics. Pediculous conjunctivitis occurs, and there is often a close association between pediculosis and phlyctenular conjunctivitis. Koch Weeks' conjunctivitis is of importance in lands where trachoma is rife, and Nicolle, Conseil and Cuenod have been studying the possibility of prophylactic inoculation, both subcutaneously and subconjunctivally.

Three other short papers also perhaps call for remark. E. Charles describes an epidemic of acute purulent ophthalmia in Gujranwala district, children being especially affected, and 12 cases seen within a fortnight. The disease began as an acute conjunctivitis followed by panophthalmitis, and all 12 patients became blind. Treatment proved quite ineffectual. S. K. Mukerjee records two cases of herpes zoster ophthalmicus, both in old men. In the first there was total destruction of the eye from rapid perforation and prolapse, the second patient recovered completely with a clear cornea and good vision. In both very severe neuralgia persisted long after the subsidence of symptoms. The same author also records a case of extensive glioma of the right eye in a child aged 1½. Exenteration of the orbit was performed, but the growth recurred, and also affected the left eye. A still further case recorded by the same writer is one of a curious syphilitic ulcer of the upper eyelid, with the characters of a tertiary lesion.

MEDICAL ENTOMOLOGY.

Dr. C. Strickland, Professor of Medical Entomology, Calcutta School of Tropical Medicine, reviews the year as follows:—

"As in last year's review, we may divide the literature on medical entomology into two compartments, one particularly affecting the clinician, the other the sanitarian.

Under *clinical entomology* the following papers may be noticed under a systematic classification, thus:—

Pathological lesions due to,

Chatopoda (leeches, flukes, etc.). Youbert has reported on a case of haemorrhagic dermatitis surrounding the site of recent leech-bite scars during an attack of malaria. The rash was excessively painful, with exacerbations carrying on for about 15 days, when it subsided. The interaction of the virus of malaria and leech bite was thought to have caused the condition.

Arachnids.—Baeng in America has studied the effect on the human being of the venom of *scorpions*, whilst Frety has confirmed previous observers who asserted that glycosuria occurs after scorpion sting. In treatment of this condition, Sharp recommends hypodermic injection of novocaine and adrenalin.

Pillers notes infection by *tongue-worms* (Linguatulide) of the human mesenteric glands, which might have been diagnosed as tuberculous.

Sequeira has made an important and useful review of some of the *mite* affections which are so common in man and domestic animals. He states that whilst *Demodex folliculorum* is generally considered harmless to man, it may cause a secondary infection giving rise to a 'ring' impetigo.

Chilopoda (Centipedes).—Baeng has studied the effect on the human being of the venom of centipedes.

Hexapoda (Insects).—*Flies*. Myiasis by the maggot has been reported by Porter from open wounds and sores, the ear, and freshly passed faeces. The maggots of both the common housefly (*Musca domestica*) and the lesser housefly (*Fannia scalaris*) have been found by Frison and Forscue respectively to infect the human intestine, sometimes causing vomiting. Desoill has produced a paper on the point, asserting that the eggs of the housefly cannot cause infestation, as they rapidly die in the gastric juice. Heras has reported an interesting case of infestation of man by the oxwarble fly (*Hypoderma bovis*), probably while the patient lay asleep in the open air. Migration of the larvae in the tissues extended from the shoulder to the abdomen and lasted for six months.

In the *public health* compartment must be included papers on systematic entomological work, between which and those of more direct importance to hygiene no hard and fast line can be drawn.

Mosquitoes.—Lieutenant-Colonel S. R. Christophers has produced a most valuable catalogue of the world anophelines, giving their synonyms; and his very important contribution should be of great utility in standardising discussion on the anopheline aspect of malaria. In another paper, he has established further varieties of common Indian anophelines.

Barraud has continued his studies and reports of the Culicine group in a series of papers, illustrated with most beautiful plates.

With regard to distribution of anophelines, Aserappa has contributed the result of a survey of the environs of Colombo, and Haworth in East Africa has discovered mosquitoes breeding in the axils of coconut palms.

On the subject of mosquito transmission of malaria, Gill has published a pleasantly philosophic paper on *A. rossii* Giles. He concludes that an answer to the question is still to seek.

Sinton and Little made another record of a species of *Culicoides* attacking the mosquito and sucking its juices, and revert to the idea that if the species can also bite man it may be a factor in the propagation of malaria.

Barzildai and others have made the interesting observation that the malarial parasite, after 82 sub-inoculations given for general paralysis, can no longer infect the mosquito. This opens up a wide vista in the study of the epidemiology of insect-transmitted diseases.

Walker has made some important observations regarding filariasis in Queensland; that *Culex fatigans* is the most efficient intermediate host, while other species may be relatively inefficient, depending on external conditions; yet others are killed by the development of the parasite, which in some species invariably dies.

Fleas and Plague.—Sinton has reviewed the diagnostic points of the Indian rat fleas, and has prepared a table thereof suitable for the general practitioner who has to deal with plague.

Hirst, continuing his important researches in Ceylon on the epidemiology of this disease *vis-à-vis* the species of rat fleas concerned, found that 98 per cent. of those in plague-free districts are *astia*, while in the endemic plague zone 30 per cent. are *cheopis* (this including a rate of 75 per cent. *cheopis* in the Customs' premises and granaries). This is yet another example of the highly specialised habits of the flea. Hirst thinks that *cheopis* flourishes better at a lower temperature and higher humidity. Experimental plague infections with *astia* were tried by working with it in an artificially cooled room. One out of 60 became 'blocked' and transmitted the disease. Both species diminish in the hot weather and *cheopis* is then less pathogenic; *astia* is a very indifferent man-biter.

On the sanitation side, Flu in Java has reviewed the measures taken to prevent plague. He does not favour fumigation with sulphur dioxide. Lal and Tiwari have tried fumigation by cresol; they state that the fleas in the rat runs (burrows) are not affected by it, though it kills off any rats which cannot get away from it.

Ticks and other mites and pseudo-typhus.—Nagayo and others in Japan have found that subcutaneous inoculation of the virus of Japanese pseudo-typhus led to no local reaction, as do mites which transmit the infection; on the other hand intradermal inoculation of the virus does produce a local reaction and lymphatic symptoms.

Walsh and Keukenschrijver in Sumatra think the rat to be the reservoir of the virus, as during an epidemic its average spleen is 1.7 times the normal size, but the animal does not get ill. Rats harboured *Trombicula deliensis* which also attacks man. Emulsified *deliensis*, injected into gibbons, produced an illness of the same nature as that produced by the injection of blood of pseudo-typhus cases.

Sandflies.—Sinton has continued his systematic researches on the structure of *Phlebotomus* species, and reports that the distribution of *P. argentipes* lies along the East Coast of India below 1,500 feet; he has also

reviewed the general relationship of *Phlebotomus* to diseases in India. Assistant Surgeon R. O. A. Smith, I.M.B., has described the methods which he has found best for breeding and raising *P. argentipes*.

Muscoid flies.—Patton and Senior White have catalogued all the oriental species of the genus *Musca*. Greene has described the puparia and larvæ of some Sarcophagids (flesh-flies). Simmonds concludes that certain ants, by preying on the maggot, keep the house-fly under control.

Cockroaches.—Sambon has continued to assert his belief in the connection of cockroaches and cancer, while Goodwin urges that more attention should be devoted to the eradication of this pest. Rau has devoted a paper to the study of its biology. Cameron finds a mixed powder of 4 parts of sodium fluoride to 1 part of boracic acid, sprinkled over the floors of a house and left for a fortnight, to be an effective blatticide.

Bugs.—Collier has reiterated the comparative unimportance of bugs as transmitters of disease; concluding that mechanical transmission may sometimes occur in plague and leprosy.

Miscellaneous.—Jucci has reviewed the work done on immunity of insects to pathogenic agents. Hutchinson has described fully his technique for the study of insect histology in the bed-bug.

Reynolds prefers formalin vapour to hydrocyanic acid gas for disinfection of premises from pests.

In addition to Dr. Strickland's review, a few other papers call for note. In view of the growing importance of sandflies as the vectors of sandfly fever, and probably of oriental sore and of kala-azar, Major Sinton's very fine series of papers dealing with the identification and distribution of species, methods of collecting and preservation, and anatomical notes on sandflies, published in the *Indian Journal of Medical Research* are of great value.

The discussion on the "insect menace" at the Indian Science Congress in 1925 was fully reported in our issues for April and June of last year. Lieutenant-Colonel F. P. Mackie read the introductory address; and a considerable number of well known entomologists took part in the discussion.

Major W. S. Patton (retd.) and Dr. H. A. Cookson record an interesting if not unique case of cutaneous myiasis caused by *Musca domestica*. An old man of 80 with varicose veins and ulcers was accustomed to sit crouched up over a fire. He had a small "hole" above the internal malleolus. Maggots of *Musca domestica* were found emerging from this ulcer, and on examination proved to be first and third instars. A female *Musca domestica* must have laid its ova in the ulcer. Major P. S. Mills records a curious case of persistent priapism in a Mahomedan boy aged 11 after the bite of a "chharbinda" (apparently a species of dung beetle).

TROPICAL DERMATOLOGY.

Thanks to the tremendous increase in the work at Major Acton's skin diseases' clinic at the Calcutta School of Tropical Medicine, and the continued introduction of aetiological investigation and classification into this confused subject, we may this year perhaps elevate "skins" into "dermatology"—a more exact science. The number of papers published during the year was considerable.

Major Acton deals with giant urticaria, or Quincke's oedema. This is an oedema of the deep fasciæ produced by the action of certain pressor bases derived from the food, acting in certain susceptible individuals with a lowered defence mechanism, either of congenital or of acquired origin. It is commoner in India than in Europe. Its age distribution is peculiar. It may occur in young infants who become hypersensitive to milk; or in adults who become susceptible to such foods as beef and pork. The swelling usually occurs some six hours or so after the ingestion of the particular food

concerned. A table of 20 cases is given where the food sensitiveness had been demonstrated by dermal tests. Lowering of the endocrine functions and hypersensitiveness of the sympathetic system are also factors in its causation. The treatment should demand in the first place the dermal tests to ascertain to what food-stuff the patient is susceptible, and cutting off this article of diet; whilst the stools should be examined for *E. histolytica* infection or other source of ulceration and absorption from the gut. The chief drug to use is adrenalin, at first given hypodermically till a full effect has been reached; then by the mouth as a combination of thyroid and suprarenal extracts.

The commonest mistake with regard to this but little recognised disease is to diagnose abscess and operate on it; or to mistake it for filarial lymphangitis.

Dr. G. Panja, from Major Acton's clinic, contributes a series of papers. One deals with superficial *pustular folliculitis* and is very well illustrated. The disease runs a course of papule eruption, pustulation and desquamation. There is itching but no pain, and the condition especially affects the legs and thighs. A *Staphylococcus aureus* was isolated from cases and produced similar lesions when a culture was rubbed into the shaved abdomen of a rabbit. The disease especially affects male adults. Treatment consists in keeping the parts dry; a lotion of hydrarg. biniodide in spirit; dusting powders and keeping the parts bandaged to prevent scratching and irritation. Depilation by x-rays is an excellent line of treatment.

The same author deals with *lichen spinulosus*, of which four cases are described. The lesions consist of symmetrically distributed groups or patches of sago-grain like papules, surmounted by filiform spines, arising from the hair follicles and situated most commonly on the abdomen and the back of the shoulders near the axillae. Scrapings shewed fungi of the *tinca* group. These cases are very resistant to treatment; but vigorous scrubbing with soap and hot water, and applications of rectified spirit, tincture of iodine and of salicylic acid ointment, 1 drm. to 1 oz., may be tried.

The same author describes some interesting cases. One was one of generalised blastomycosis in a Hindu girl aged 8, with a ++ Wassermann reaction. The diagnostic points about the condition are patchy lesions with a healing centre and pustular spreading margin. Fungi were discovered on examination of scrapings by the liquor potasse method. X-rays constitute the best line of treatment, but potassium iodide may be given in large doses, and unguentum hydrarg. ammon. dil. A second case was one of melanoderma in a Hindu male aged 19, with a negative Wassermann reaction. Yeast-like organisms, the so-called spores of Malassez were found. The condition present was one of discrete small round black spots, chiefly on the abdomen. Treatment of the condition consists in the use of sulphur soap, a bismuth and hydrarg. perchloride lotion, and touching the spots with trichloroacetic acid. A third case was one of malignant pustule of the left arm near the axilla in a hide worker, in which the specific bacilli were demonstrated, but no typical black scab was seen even after 12 days' duration of the disease. A fourth case was one of multiple soft fibromata of the face with a facies simulating that of nodular leprosy, and isolation of a diphtheroid bacillus from the lesions. An even more extreme case of a similar condition is recorded by (Dr.) Mrs. E. B. Carr, of a woman aged 40 whose whole body was covered with multiple neuro-fibromata, the condition dating from early childhood. One breast was so infiltrated as to be enormously hypertrophied, the nipple being 10½" from the chest attachment. On amputation the breast weighed 3½ lbs.

Lieutenant-Colonel J. Cunningham and S. Ramakrishnan have investigated the types of streptococci in lesions of the skin and mucous membranes. Of 141 strains isolated and examined hæmolytic varieties were slightly in excess of non-hæmolytic. Of the hæmolytic varieties the *sub-acidus* and *anginosus* strains were most

common; of the non-hæmolytic strains *agnavus*, *salivarius* and *mitis* types.

(The reviewer may perhaps be permitted in this connection to draw attention to the great importance of hæmolytic streptococci in general medical practice in the tropics. They are the usual cause of puerperal fever in India; they are the causative agents of many acute dermal and ocular lesions; in the gut a secondary infection with hæmolytic streptococci may follow an infection with *E. histolytica* and cause all sorts of unexpected symptoms by invading the blood stream; they are probably associated with the acute endocarditis of certain fevers of Bengal; during the great influenzal pandemic, as seen in Assam in 1917-18, the reviewer found them almost constantly present in all sputa cultured; and considered that they were an important pathogenic feature of the outbreak—although other workers had an entirely different experience; they are the organisms most commonly found in the almost epidemic sore throat which invades Calcutta city every cold weather; they may have something to do with the pernicious type of anæmia encountered in sprue. In brief, hæmolytic and infective strains of streptococci appear to abound in the Indian atmosphere.)

Major J. F. James, writing from Kohima, advocates a treatment for *Naga sore* and *ulcus tropicum* which he has found very successful. Bits of lint quarter of an inch thick, made to fit the ulcers or slightly overlap them, are soaked in a 25 per cent. solution of magnesium sulphate, applied and covered with oiled silk or plantain leaf. If the ulcer be very foul preliminary cleansing with hot permanganate baths is advisable. The dressing must be properly applied and the waterproof covering must overlap the soaked lint to prevent evaporation. This dressing is very cheap, painless, and efficacious.

P. B. Ran advocates the use of *bouchi*—(*Psoralea corylifolia*)—in leucoderma. A favourite application of it in Ayurvedic medicine has the following composition; yellow orpiment, 1 part; *bouchi* seeds (ground up presumably) 4 parts; made into a paste with fresh cow's urine. Probably water may be substituted for cow's urine.

Captain D. M. Bhatavadekar describes a case of multiple nevi in an Indian male, aged 25. One naevus occupied the area over the left scapula, shoulder, axillary and thoracic regions and measured 25" X 10"; a second extended from between the scapulae to the occipito-perieto-temporal junction, and was 12" X 9"; there were some 20 hairy moles, 1" to 4" in diameter scattered all over the body; about 200 small moles similarly distributed; small pigmented patches on the palms and the hard palate; whilst the left half of the scrotum was empty and the patient had phimosis. The whole condition was of congenital origin. Flat, raised and fatty moles were all present simultaneously. The distribution of the lesions did not in any way correspond to any innervation areas but appeared to be universal and scattered.

Mr. R. L. Spittel, F.R.C.S., in a most interesting article, describes the art of the Indian *chiroprapist*. His little handbag is the only thing respectable about this intriguing rogue, although his "chits" are usually highly laudatory. His armamentarium consists of a sharp oblique-edged chisel made from an old Kropp razor, used for thinning down the corn; a probe; and an assortment of conical horn cups. These latter are applied to the corn after it has been thinned down, suction is made by the lips and the little aperture at the conical end of the cup sealed with wax. His technique is of course intensely septic, but it is surprising how much relief it affords. On the other hand the complete removal of the epidermal plug is beyond him; he does not attempt it.

Assistant Surgeon R. W. Scanlon, I.M.D., describes a case of acute dermatitis due to the use of marking nut, and such cases are probably not uncommon in India, though infrequently reported in the journals.

Marking nut juice was applied by the patient for treatment of ringworm of the scalp. Four days later there was acute erythema and vesication over the biceps area of the left arm which had come into contact with the anointed scalp.

PATHOLOGY, LABORATORY METHODS, VACCINES, SEROLOGY, ETC.

Priority of place must certainly be given to Sir Leonard Rogers' exceedingly interesting review of *pathological evidence relating to disease incidence as seen in Calcutta*, published in the *Glasgow Medical Journal* during the year. Here a careful comparison is made between the analysed results of 1,600 consecutive post-mortem examinations made at Calcutta in comparison with 1,000 consecutive post-mortems made at St. Mary's Hospital, London. Considerations of space prevent our doing more than quoting the author's conclusions, and the paper has already been fully dealt with in our *Current Topics* section in 1925. Sir Leonard's conclusions are as follows:—

"1. Both the post-mortem records and the vital statistics of Calcutta show that one-third of the mortality is due to tropical diseases, and two-thirds to those of world-wide distribution.

"2. The age incidence shows four times as many deaths in persons over 50 years of age in the London as in the Calcutta post-mortems, and this proportion is the same when the purely tropical diseases are excluded from the calculation.

"3. The Calcutta figures show a great excess over the London ones in deaths from septicæmia, tetanus, tuberculosis, lobar pneumonia, non-tubercular meningitis, and cirrhosis of the liver—the first, fourth, and fifth being caused by the streptococcal group of organisms, which are favoured by the high mean temperature and overcrowding in the houses.

"4. The London series shows a marked excess in the case of circulatory diseases, especially in the case of rheumatic endocarditis and mitral stenosis secondary to it, which is nearly, if not quite, absent in Bengal; and to a less extent in atheromatous disease including aneurysms, due to the age factor, as atheromatous changes have a very similar age incidence in different decades of life in both series, and afford no evidence of especially early degenerative arterial affections to account for the shorter life of the Bengal race, while cerebral hæmorrhages are also much more frequent in the London series, also on account of the age factor.

"5. The four-fold excess of cirrhosis of the liver in Bengal cannot be explained on the alcoholic theory of its causation, as that is a very small factor in India, but evidence is produced that it is secondary to chronic ulceration of the gastro-intestinal tract, chiefly in the form of long-standing amœbic dysentery.

"6. The Indian races in Bengal have a lower resisting power against many specific diseases, such as pneumonia, cholera, dysentery, tuberculosis, fevers, etc., which are the most frequent causes of death in them, than Europeans living in Bengal, which is the main cause, in addition to the prevalence of tropical diseases, in their low expectation of life; and is probably due partly to low racial vitality, most likely associated with the custom of early child marriage, and partly to insanitary conditions."

With regard to the vexed question of the incidence or relative non-incidence of cancer in Asiatic races, Sir Leonard concludes as follows:—

"1. Malignant tumours, including both connective tissue and epithelial types, are about equally common in Bengal and England, with a slight excess in the tropical country, quite contrary to the statements of those who maintain that civilised races suffer eight times as much from them as uncivilised primitive peoples.

"2. Both innocent and malignant connective tissue tumours are considerably more common in Bengal than in England, while the reverse is the case with both innocent and malignant epithelial tumours; which supports the view that the innocent forms shade off into or may take on the characters of malignant ones.

"3. The slightly lower incidence in Bengal of the malignant epithelial tumours or carcinomata is fully explained by the age factor, as the higher rate in London is more than accounted for by the great excess of persons of the cancer age of over 40 or 50 years in England as compared with Bengal.

"4. Cancers of the tongue, œsophagus, stomach, large intestine, and breast show considerable excess in the London pathological examinations, while those of the skin, penis, both the cervix and body of the uterus, liver, and gall-bladder are in excess in India, nearly all of which are explainable on the known laws of long-continued irritation being the most important predisposing or exciting cause of cancer. This relationship is strikingly illustrated by the figures given, showing that gall-stones and cancer of the gall-bladder are rather more common in Bengal than in London, for it has been proved experimentally that the presence of gall-stones may induce cancer formation in this viscus.

"5. The three-fold excess of cancer of the uterus in Bengal is probably related to early menstruation, child-bearing and menopause in the Bengali race leading to earlier and more frequent development of cancer in them as compared with European females.

"6. In future, the onus will lie on those who proclaim the rarity of malignant growths in uncivilised races of proving their assertions by extensive and accurate pathological data, such as those on which the above conclusions are based, for about 90 per cent. of the Bengal population who furnish a large proportion of the Calcutta hospital cases, live in villages under primitive conditions, and on a diet of natural foods."

A useful cheap pattern of hypodermic outfit is described in our issue for January 1925 by Dr. J. W. Tomb. The studies on laboratory technique, copiously indexed and cross-referenced, by Lieutenant-Colonel W. F. Harvey were continued during the year in the *Indian Journal of Medical Research* in all four numbers published during the year, and this monumental and most useful reference book may perhaps become available as an inclusive volume in the near future. H. Ghosh has studied the *action of certain chemicals on bacteria*. He finds that 1/640th of a c.c. of 30 per cent. magnesium sulphate solution exerts an attenuating effect when added to a culture of *B. proteus*, but when different amounts of a 20 per cent. solution of calcium chloride are added, this effect is inhibited. Similarly, 1/128th of a c.c. of a 4 per cent. solution of zinc sulphate has a similar attenuating effect, but this effect is again inhibited by the addition of different amounts of the same calcium chloride solution. The interaction of chemical substances in a bacterial culture, in other words, is perhaps of importance.

Major J. A. Sinton and A. C. Banerjea advocate the *thick film method of examination* in suspected malaria. Their technique is to take a thick film on one half of a slide, and a thin film on the other half. The thin film is fixed by dipping this half of the slide into methyl alcohol. After drying, the whole slide is next flooded with diluted Giemsa's stain, the stain subsequently flooded off with distilled water, and the film allowed to dry in air. Over 10,000 films were examined in a year by this method. The relative numbers of parasites encountered were as 1 to 6 for thin and thick films in cases of *P. vivax* infection, and 1 to 20 in cases of *P. falciparum* infection. Major Sinton also deals with the so-called hæmogregarines of man. Bodies resembling hæmogregarines were found in 10 slides out of a batch of 50 examined. He agrees with Dr. Wenyon that such pseudo-hæmogregarines are in reality vegetable cells derived from the atmosphere and contaminating the slide.

Dr. P. Ganguli raises the question as to whether *Trichomonas hominis* is pathogenic or not. This protozoal parasite was found in 43 patients, of whom 36 suffered either from diarrhoea or dysentery. In 3 of the cases cultures failed to shew any bacterial cause for the disease. In 7 instances the parasite was present in a formed stool. He considers that infection with *T. hominis* is probably analogous to infection with *E. histolytica*; there may be a carrier condition or an acute lesion of the gut. Oleum terebinthinæ treatment appears to be successful. S. K. G. Dastidar records *Trichomonas* infection in the urine in 3 male and 1 female patient. Symptoms of mild urethritis were present which cleared when the trichomonads disappeared. (The whole question at issue is fully dealt with by Assistant Surgeon B. M. Das Gupta in our issue for January, 1926.)

From Madras, Dr. Turkhud reports that Dr. Sitapati has carried out a series of experiments with *B. coli* derived from both human and bovine sources, with a view to determining the possibility of grouping them on a serological basis. The enquiry is still in progress.

Vaccines.

Nand Lal comments on the use of carbolic acid as a sterilising agent for bacterial antigens. In the commonly used strengths of vaccines it will effectively sterilise the emulsion without the aid of heat. The time required varies with the strength of carbolic acid used and for different organisms. The same author deals with the viability of bacterial cultures. Efficient sealing up of cultures is an important factor in their preservation. The reaction of the culture medium is also important in connection with the duration of life of the bacteria.

Serology.

Major R. B. Lloyd, Professor of Serology, Calcutta School of Tropical Medicine, contributes the following notes:—

"No very striking advances have occurred during the year, though the discoveries of Gye and Barnard may possibly open the way to a serological attack on the cancer problem.

"In many parts of the world the various flocculation tests for syphilis have been examined, and with a few dissentients the large majority of workers are of opinion that while useful up to a point, the flocculation reactions with the possible exception of the Sigma reaction are inferior to the Wassermann test.

"Reports have now come forward chiefly from American sources that the new Wassermann technique introduced by Kolmer is very valuable. This is an important technical improvement. It is interesting to observe, as Wassermann work has become more and more accurate, that some diseases—other than syphilis—formerly thought to yield a positive Wassermann reaction have now dropped out of the list. In this list there are only two diseases left, viz., yaws and leprosy and it is believed that the new Kolmer technique eliminates leprosy.

"Our own results have indicated that the positive Wassermann reaction met with in leprosy is frequently due to syphilis. This opinion is based upon indirect evidence of various kinds. (1) The power of antisyphilitic treatment to remove in many instances the positive reaction in leprosy. (2) The fact that positive results with the Sachs-Georgi and Kahn flocculation reactions in leprosy run broadly parallel with the Wassermann positives. (3) The fact that the new Kolmer technique is reported to give negative reactions with leprosy when uncomplicated with syphilis. (4) The marked improvement clinically which some cases show under antisyphilitic treatment. No final judgment on this question can be given yet and further research is necessary. If this view is to prevail, we have to compare the percentage of positive Wassermann reactions in leprosy (about 40 per cent.) with that in the general

population, which we may put at 15-25 per cent. The difference is very marked, and if these reactions in leprosy are due to syphilis it would appear to indicate that the latter is an important predisposing cause of the former, which will render the solution and control of the leprosy problem no easier.

"In connexion with blood grouping work, attention has been focussed on quantitative direct matching tests between the recipient's and donor's bloods mixed together under *in vitro* conditions approximating to the *in vivo* conditions obtaining after a transfusion. The importance of this lies in the fact that transfusions may be carried out on a scientific basis without previous grouping as a laboratory procedure.

"Use has been made of the specificity of precipitin antisera to determine the precise nature of the blood upon which blood-sucking insects have fed. This enables workers upon insect-borne diseases to concentrate attention on those insects known to feed on man as possible vectors of such diseases as malaria and kala-azar."

With regard to the Wassermann reaction, Dr. Turkhud reports that Dr. Ramakrishnan is at present engaged in Madras in making a comparative study of the Kahn's precipitation and the Wassermann tests.

Major L. A. P. Anderson and Major Sinton report the results of 63 cases tested one to three hours after the administration of adrenalin by injection by the Medical Research Committee's Report (1918) No. IV method. Doses of one mgm. of adrenalin failed to make a negative Wassermann reaction positive. In our issue for January, 1925, Major Lloyd deals fully with the comparative results of different serological reactions to-day in use for the serological diagnosis of syphilis.

MEDICO-LEGAL NOTES.

The only paper of interest during the year was Major C. A. Godson's analysis of 660 post-mortem held at the police morgue in Calcutta during 1923-24. No less than 149 fatal street accidents were included, most of them due to reckless motor driving by the "Taxi Singhs" of the community. Suicide by burning is very common among Indian females. Opium proved to be the commonest poison in use and probably many cases classed as deaths due to an accidental overdose are really cases of suicide. In an interesting case of carbon monoxide poisoning three persons occupied the same room; the mother died, the father was admitted to hospital in an unconscious state but recovered, whilst a young child appeared to be entirely unaffected. A dose of 30 minims of extract of *nux vomica*, given by mistake for a corresponding dose of liquid extract of ergot, proved fatal, although such a dose only contains 2½ths of a grain of strychnine.

SERVICE NOTES.

Lieutenant-Colonel C. C. Murison discusses hospital administration, with special reference to the detaining of patients and to the record of diagnosis in hospital registers, in our issues for March and September.

Lieutenant-Colonel J. K. S. Fleming, Deputy Director-General, I.M.S., reviews the year as follows:—

"Since the service notes forwarded by Colonel Needham in November 1924 were written, the whole future of the Indian Medical Service has been in the melting pot, and the Secretary of State's announcement that the Indian Medical Service must be retained, although it would be essentially a military service, must have undoubtedly come as a relief to many.

Its reconstitution, in so far as the future employment of officers in civil, etc., is concerned, is now being considered in consultation with the local Governments, and orders in connection therewith will, it is expected, be issued in the near future. The rights of those at present in civil employ will, no doubt, be adequately safeguarded.

Memorials have, it is understood, recently been submitted to the Government of India from Indian members of the Service whose commissions are dated prior to 1st December 1925, praying that the concession of free passages to Europe and back which has recently been sanctioned by Government on the recommendation of the Lee Commission for European members of the Service may be made applicable to them: the matter is under consideration.

In the *Gazette of India* for May 1925 the following Royal Warrant was published regarding the age for compulsory retirement of an I.M.S. officer holding the appointment of the Director of Medical Services in India:—

George R. I.
Royal Warrant.

Whereas We deem it expedient in the interests of the Service to make the following change as to the age at which officers of Our Indian Medical Service holding administrative appointments shall be placed on the Retired List.

Our will and pleasure is that an officer of Our Indian Medical Service holding the appointment of Director of Medical Services in India shall be placed on the Retired List on attaining the age of 60.

Our warrant dated 13th June 1919 shall be amended accordingly.

Given at Our Court at St. James's this 17th day of March 1925, in the fifteenth year of Our Reign.

By His Majesty's Command.

(Sd.) BIRKENHEAD.

A conference of Inspectors-General of Prisons was held in Ootacamund in October 1925. The findings of the conference have not yet been published.

The Government of India have decided, with the approval of the Secretary of State, that military Indian Medical Service officers who are appointed to the *Medical Store Department* should remain under military rules for the purposes of privilege leave; and that the temporary charge pay of Rs. 50 p.m. admissible to Assistant Surgeons should be made definitely applicable to the charge of a Medical Store Depot in the absence, on privilege leave, of the permanent incumbent.

Government sanction has also been accorded to the raising of the salary limit laid down in para. 273(c) of *Pay and Allowance Regulations*, Part II, for the grant of Presidency house rent at Madras, from Rs. 1,400 p.m. to Rs. 2,500 in regard to officers of the I. M. S. in military employ.

Under Army Instruction (India) No. 401 of 1925, sanction was accorded to the grant of overseas pay in sterling to officers of the Indian Medical Service in military employ in accordance with the terms laid down therein.

Sanction has also been accorded in Army Instruction (India) No. 5-S., dated 25th July 1925 to the grant of leave passage concessions to military officers. The rules governing the same are published as an Appendix to the Army Instruction.

In accordance with Army Instruction (India) No. 912 of 1925, separation allowance is admissible to married officers of the R. A. M. C., I. M. S. (in military employ), Royal Army Veterinary Corps and Army Dental Corps, when their families are not allowed to accompany them to the station to which they are posted, for example frontier stations such as Razmak.

Under Army Instruction (India) No. 950 of 1925, regular executive officers of the Indian Medical Service, while on leave in India other than privilege leave

will receive pay at the following rates, to which full overseas pay will be added, when admissible.

	Rs.
Lieutenants	375
Captains:—	
During first 3 years service as Captain ..	500
With more than 3 years service as Captain ..	600
With more than 6 years service as Captain ..	700
Majors:—	
During first 3 years service as Major ..	750
With more than 3 years service as Major ..	900
With more than 6 years service as Major ..	1,050
Lieut.-Colonels:—	
Until completion of 23 years total service ..	1,200
During 24th and 25th year of service ..	1,300
After completion of 25 years service ..	1,400
When selected for increased pay ..	1,550

These rates will have effect from the 1st January 1926.

Under India Army Order 693 officers proceeding on privilege or combined leave ex-India may draw privilege leave pay either in advance or in arrears in the United Kingdom. Privilege leave pay when drawn in the United Kingdom is payable in arrears only.

In accordance with Army Instruction (India) No. 662 of 1925, an outfit allowance of £50 is admissible to officers granted permanent commissions in the Indian Medical Service on or after 1st July 1919 and to future entrants. The allowance will be reduced by the amount of any outfit allowance already drawn by such officers in respect of any previous commissions held in the Indian Medical Service or any other arm of Service, if they were appointed before the 20th December 1923. For officers appointed on or after that date, the allowance will only be reduced if they held the previous commissions within three years of the date of their permanent commission in the Indian Medical Service.

Under Army Instruction (India) No. 410 of 1925, when a British medical officer is ordered by a competent authority to proceed to another station in India at which no British medical officer is available to attend the wife or a female member of the family of a British officer or British other rank, who is entitled to free medical attendance, he will be granted travelling allowance under the rules in Army Regulations, India, Volume X, as amended by Army Instruction (India) No. 573 of 1924.

In the event of the British medical officer being unable to leave his station, a competent authority may sanction the free conveyance of the patient to and from that station.

The present strength of the I. M. S. is:—

Permanent officers—	
European	507
Indian	164
Temporary officers—	
European	6
Indian	134

Up to the 3rd December, there had been no less than 34 officers lost to the I. M. S. during the year; the list being as follows:—

Died.—Colonel J. A. Black and Captain J. F. Holmes.
Resigned.—Captains H. Watts Taylor, A. L. Watts and A. F. G. Raikes.

Retired.—Colonels F. L. Blenkinsop, F. Wall and P. Dee.

Lieutenant-Colonels G. A. Jolly, H. Emslie-Smith, A. E. Walter, H. H. G. Knapp, R. A. Lloyd, O. St. John Moses, A. Leventon, A. T. Gage, A. M. Fleming, J. M. Woolley, J. C. G. Kunhardt, L. Hirsch, E. C. C. Maunsell, F. D. S. Payrer, R. Bryson, G. F. Marr, F. O. N. Mell, J. V. Illius, Sir D. G. R. S. Baker, Bart., H. A. F. Knapton, A. G. Coullie, and J. L. Marjoribanks.
Majors A. E. Grisewood, J. A. Cruickshank and G. H. Cross.

Invalided.—Major J. A. Horne."

Original Articles.

CHOLERA IN THE PUNJAB IN 1925.*

AN EPIDEMIOLOGICAL NOTE.

By C. A. GILL, D.P.H., D.T.M. & H.,

LIEUT.-COLONEL, I.M.S.,

Offg. Director of Public Health, Punjab.

(1) *Preliminary Remarks.*—Before describing the recent outbreak of cholera in the Punjab, which, as will shortly be suggested, may possess a significance out of proportion to its magnitude, it is necessary to refer briefly to the recent history of cholera in northern India. In the year 1924 a recrudescence of cholera of unusual magnitude took place in the endemic home of the disease (Bengal, Bihar and Orissa), but as the Punjab is outside the endemic zone it was not directly implicated in this revived activity of the disease. This Province was, however, indirectly affected, since the incidence of cholera in the Punjab is closely dependent upon the annual importation of infection from the endemic zone. It should be explained that no permanent foci of cholera are known to exist in the Punjab and that in almost every instance outbreaks of cholera in this Province are directly or indirectly traceable to importation of infection from outside the Province. In the majority of cases the disease appears to be introduced by Hindu pilgrims returning from the great religious festivals held at Hardwar in the United Provinces, which place, it is understood, is constantly infected by pilgrims hailing from Bengal and Bihar and Orissa. The great fair held annually at Hardwar in the United Provinces has in fact long functioned, at any rate since the year 1867, as the immediate source of outbreaks of cholera in the Punjab, and in 1924 Hardwar again played its usual rôle, but in addition, the *Adh Kumbh Mela*, which was held at Allahabad in February 1924, was also in part responsible.

Mainly as the result of infection imported by pilgrims returning from these fairs, the Punjab, after two years of almost complete freedom from cholera, experienced a mild epidemic during the summer of the year 1924, with the result that 4,118 cases and 3,551 deaths occurred as compared with 25 cases and 11 deaths (all dependent upon importation) in the previous year, and 287 cases and 128 deaths during the year 1922. But although the mortality in 1924 was not great, 24 out of 29 districts and 56 out of 159 towns were infected.

The behaviour of cholera during the year 1924 was absolutely normal, its direction of spread being from the south-east to the north-west, its period of prevalence being confined to the months of July, August and September, and Hindu pilgrims being, as usual, the first to suffer. In November 1924, in accordance with custom, the disease disappeared completely from all parts of the Province and from this time onwards until the beginning of April 1925, the Province was, so far as is known, completely free from cholera.

The State of Kashmir and Jammu, which is located beyond the northern frontier of the Punjab at a considerable elevation above sea-level in the Himalayas, was also infected with cholera in the summer of the year 1924 in the same manner as the Punjab, i.e. by Hindu pilgrims returning from the pilgrim centres located in or near the endemic zone, but in Kashmir cholera behaved in a peculiar manner, since, contrary to custom, it continued to prevail throughout the winter of 1924-25 when the country was under snow and the thermometer was many degrees below freezing point. So absolutely without precedent (so far as the Punjab is concerned) did this appear that in January 1925, enquiries were made (but unfortunately they met with no response) from the medical authorities of Kashmir State as to the accuracy of the reports. Subsequent events however confirmed the diagnosis, since with the onset of spring (March) a definite recrudescence was followed by a severe and extensive epidemic of cholera which is reported to have caused up to the middle of August 1925, about 20,000 cases and 10,000 deaths.

(2) *Brief Account of the Punjab Epidemic.*—As already stated, the Punjab remained completely free from cholera up to April 1st, 1925, but on or about this date a small outbreak, which was not reported at the time, occurred amongst Muhammadans at a town (Pind Dadan Khan) situated in the north of the Province on the Jhelum river in the district of that name. Subsequent investigation showed that infection was conveyed from this place to an adjacent village in the Salt Range where a large fair attended by some 50,000 people was being held. Everything passed off well at the fair until it was about to end on April 12th, when an explosive outbreak of cholera involving several hundred persons broke out almost simultaneously amongst the pilgrims who were at that time dispersing (or about to disperse) to their homes. This is the usual course of events, since it is a rule to which the exceptions are few, that irrespective of the duration of a fair, cholera rarely breaks out until a fair is about to conclude. There are two possible explanations of this curious phenomenon; in the first place the earliest cases of cholera are rarely typical, and secondly, a strong tendency exists upon the part of all concerned to hide the existence of the disease as long as possible and more especially until the completion of the religious ceremonies that usually culminate in a

* Note.—An abstract of this report was prepared at the request of the Public Health Commissioner with the Government of India, for submission to the Office International d'Hygiène Publique at its session in October, 1925.

ceremonial ablution and drinking of the sacred waters on the last day of the fair.

The immediate source of the outbreak is thus traced to an unreported focus of infection in a neighbouring town, but the manner in which this town became infected—it had been free from cholera for several years—could not be determined. It is, however, probable that infection was imported by human agency from Kashmir State, one of whose boundaries is coterminous with that of Jhelum District. It is significant perhaps of the accuracy of this surmise that, on those rare occasions during the past 60 years when cholera has continued to prevail in Kashmir throughout the winter, Jhelum district is usually the first district of the Punjab to become infected.

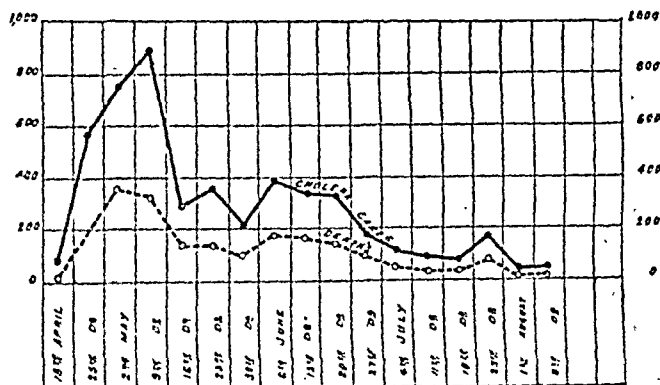
The subsequent history of the Punjab epidemic was readily traced owing to the fact that the rest of the Province was completely free from the disease. There was in the first place an extensive infection of Jhelum district and of the adjoining districts of Shahpur and Gujrat by means of pilgrims travelling by road. Secondly, infection was rapidly transmitted over long distances by rail—many pilgrims developed cholera in transit—with the result that small outbreaks occurred in eight districts at a long distance from the primary focus. It thus came about that within the space of ten days about 800 cases and 320 deaths occurred almost solely amongst pilgrims in eleven different districts of the Province. As soon as the result of the original explosive outbreak subsided it became evident that secondary epidemics were taking place in many localities, all or nearly all of which followed—sometimes with remarkable rapidity—upon the arrival of an infected pilgrim. It should here be stated that, although the original outbreak had the explosive characteristics of a water-borne epidemic, the secondary epidemics were of small magnitude and confined almost solely to contacts or to persons who had shared the same food or drink (house infection) as persons suffering from cholera. A few secondary epidemics, however, exhibited fulminant characteristics, and in these outbreaks there was strong reason to believe that wells or small canals (which in certain localities constituted the sole source of water) had become infected with the germs of cholera. In one instance, for example, the corpse of a person who had died of cholera was found in a canal distributary, that formed the water supply of a village. Nevertheless, the character of most of the secondary outbreaks suggested "house-infection" rather than a water-borne epidemic. Some of these secondary epidemics acted in their turn as distributing centres, and in this manner the number of infected localities—each actively infective for a brief period only—gradually increased so that within three weeks of the first appearance of the disease 2,240 cases and 913 deaths occurred. From the middle of May onwards the disease began to decline and by the first week of June the epidemic had almost subsided. Early in this month, however, as the result

of a fresh invasion of cholera from the United Provinces, cholera appeared in certain hitherto uninfected localities in the extreme south-east of the Punjab. This circumstance caused a temporary rise in the weekly returns during the month of June, but it was short-lived and in the week ending August 1st only 37 cases and 15 deaths occurred throughout the Punjab. This second small wave of cholera which came from the United Provinces, would appear to represent both in regard to its source of origin and to its seasonal periodicity the normal characteristics of cholera in this Province, whereas the earlier outbreak constitutes an exceptional occurrence without precedent, both in regard to time and space, during the past 30 years. The total number of cases and deaths from cholera during the period from April 1st to August 8th, 1925, was 5,841 and 2,129, respectively.

The chart shows the weekly incidence of morbidity and mortality during the above period.

CHART.

Showing the weekly number of cases and deaths from Cholera in the Punjab during the period April 1st to August 8th, 1925.



(3) *Preventive Measures.*—As no instance of an extensive epidemic of cholera during the months of April and May is recorded to have occurred in the Punjab during the past 30 years, no particular apprehension was felt in regard to the occurrence of cholera in the Katas fair in April 1925, more especially as the Province was free from infection at the time. It has however since come to light as the result of a scrutiny of the Punjab Sanitary Reports during the period 1862-1881 that widespread epidemics of cholera have occurred, notably in the years 1867 and 1879, in the months of April and May—and it is now known also that these early epidemics in the north of the Province were frequently associated with the persistence of cholera throughout the winter in Kashmir.

In accordance with routine orders, arrangements were made a week before the commencement of the Katas fair under the personal supervision of the District Health Officer to disinfect and to protect the water-supply and to provide for the sanitation of the fair. The arrangements were, however, based upon the assumption that

the attendance at the fair would be normal, i.e., about 10,000 to 15,000 people, whereas it is calculated that about 50,000 persons actually attended the fair. In these circumstances it is not surprising that the water-supply arrangements should have proved inadequate and that people drank water from the sacred tank (which indeed forms part of the religious ceremony on the last day) and from polluted streams in the neighbourhood. It is obvious therefore that given a case of unreported cholera amongst the pilgrims, an explosive outbreak of the disease was only too likely to occur. As soon as the first case of cholera came to light on April 12th, the tank and streams were again disinfected, but the damage was then done and all efforts were therefore concentrated upon preventing the spread of infection by returning bands of pilgrims. On April 14th, when the first report regarding the outbreak reached the Public Health Department, a general warning was issued to the civil and military authorities, to neighbouring Provinces, to the railway administration and to the public, whilst orders were sent to all Medical Officers of Health and Civil Surgeons directing them to keep watch over pilgrims returning from the fair and to make immediate preparations to isolate and treat all travellers from the infected area presenting symptoms suggestive of cholera. District Health Officers were also directed to take steps to ensure that cholera outbreaks were promptly dealt with and to see that the "cholera depots" established in rural areas were equipped with medicines, disinfectants, and vernacular pamphlets explaining the nature of the disease, its mode of spread and treatment. Arrangements were also made to enable anti-cholera inoculation to be carried out on a large scale and the equipment necessary for this purpose and for giving intravenous injection of hypertonic saline together with potassium permanganate, kaolin and the essential oils mixture, was also provided. In collaboration with Civil Surgeons and Deputy Commissioners the medical personnel of every infected district was mobilized for the purpose of carrying out the above scheme. These measures were carried out vigorously and promptly and every infected locality was visited almost immediately by a medical officer and a report was submitted showing in each case the cause of the outbreak and the measures taken to deal with it. Anti-cholera inoculation was a novelty to the countryside and consequently only some 4,645 inoculations—mainly confined to contacts and those proceeding to an infected area—were performed. As small outbreaks continued to occur after the subsidence of the main epidemic, mainly in connection with small fairs, it was decided to prohibit by executive order the holding of fairs in infected or recently infected localities. Finally, as a means of checking the re-introduction of infection from Kashmir, a medical inspection post and cholera camp was established, with the previous sanction of the Punjab Government, at

Kohala on the main road from Kashmir where the names and addresses of all persons coming from Kashmir were taken for transmission to the medical authorities at the destination of the traveller. The post, in spite of the restricted nature of its functions, fulfilled a decidedly useful function but, owing to the decline of cholera in Kashmir at the end of July, it was closed on August 1st, 1925.

(4) *Summary.*—This small epidemic of cholera is noteworthy by reason of the fact that it exhibited certain epidemiological features of great interest.

In the first place the appearance of cholera in epidemic form in the month of April instead of in the "normal" season (July-September) being without precedent during the past 30 years, was highly abnormal.

Secondly, the spread of infection from the north instead of from the endemic area in the United Provinces was likewise a most exceptional feature.

Thirdly, contrary to custom, the epidemic involved Muhammadans in its early stages instead of Hindus.

Finally, the decline of the epidemic took place at the height of what has hitherto been regarded as the "normal" cholera season.

The first three features would all appear to be referable to the fact that cholera, contrary to custom, prevailed throughout the winter in Kashmir—95 per cent. of whose inhabitants are Muhammadans—whence it is assumed to have spread early in the year to the adjoining district of Jhelum in the Punjab. The early decline of the epidemic—assisted no doubt by action taken to combat it—would appear to suggest that the epidemics of cholera exhibit a somewhat labile seasonal periodicity in this Province. Indeed, it is noteworthy that in several of the Sanitary Reports of this Province of over 30 to 60 years ago, it is stated that cholera epidemics that start in April may be expected to end in August, whereas those starting in June and July are likely to continue until October and November. It is appropriate here to pay a small tribute to the memory of Bryden, Cunningham and more especially of Bellew—a whilom Sanitary Commissioner of the Punjab—by stating that the accuracy of many of the epidemiological observations made by them at a time when our ignorance of the ætiology of epidemic diseases was profound, is a constant source of admiration.

(5) *Conclusion.*—A study of the Punjab Sanitary Reports and of Bellew's *History of Cholera* brings to light certain facts which suggest that this relatively unimportant outbreak may represent an incident in the history of cholera of considerable importance.

It indeed appears that at irregular periods which usually recur about once in every twenty or so years, cholera, after exhibiting unusual

prevalence in its endemic home, assumes enhanced powers of diffusion and toxicity as the result of which it spreads along "the northern epidemic highway" of Bryden not only to the Punjab but also to Kashmir and thence to Central Asia and to Europe. Eight so-called pandemics of cholera are thus recorded to have occurred during the nineteenth century, the last of which, it may be noted, commenced in India in the year 1900 or 25 years ago.

On examining the local history of these pandemics, as recorded in the Punjab Sanitary Reports, it appears that each has been associated with an almost precisely similar sequence of events—viz. the abnormal prevalence of cholera in one year in the endemic home, the infection of Kashmir late in the same year, the *persistence of cholera in that country throughout the winter* and the extensive infection of the Punjab in the following spring. The history of cholera in Kashmir is not completely known, and it may be that cholera has exhibited this hibernal activity in Kashmir at other times, but it would appear that the marked persistence of cholera throughout the winter has been a distinctive feature in the history of the majority of the recorded pandemics. In these circumstances it is possible that recent events in Kashmir may represent the second stage of a new pandemic of cholera of which the severe epidemic in the endemic home of cholera in 1924 constituted the first stage.

In the light of this surmise the appearance of cholera in the Punjab in April 1925 may possess considerable significance, but whether this be so or not it is abundantly clear that a widespread infection of the Punjab in the spring markedly facilitates the introduction of cholera into Afghanistan and thence into Central Asia, for, if cholera should prevail in the Punjab during the spring, it will synchronise, as recently remarked by Fry, with the period when thousands of Afghans (*Powindahs*) are passing through the Punjab on their way back to Afghanistan. The occurrence of cholera in the Punjab in the spring instead of during the normal cholera season (July—October) is therefore likely to lead to the infection of Afghanistan on a large scale. That this migration (which is confined to the spring) actually led to the spread of infection to Afghanistan during the present spring, is borne witness to by a military staff officer stationed on the north-west frontier who informs me that he personally saw in May 1925 several caravans hastening in panic-stricken flight through the passes into Afghanistan leaving behind them uncontrovertible testimony (in the shape of a trail of cholera corpses) of the fact that cholera was exported into Afghanistan in the month of May 1925.

It seems, therefore, possible that the stage is set for an epidemic of cholera in Afghanistan and that in due time and season the repercussion of recent events in the Punjab will be felt in distant parts of Asia and even in Europe.

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AN ACCOUNT OF AN OUTBREAK OF CHOLERA AT GOALUNDO GHAT.

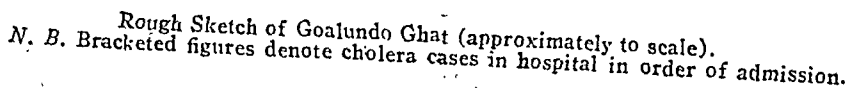
By W. J. MARSHALL,

Supervising Medical Officer, Goalundo Ghat Hospital, Goalundo.

THE hospital, which I have the pleasure and privilege to serve in conjunction with Sub-Assistant Surgeon Amrita Lall Chanda, Medical Officer-in-Charge, has had what would appear to be a very unique experience. Between the 19th September, 1925, and 8th October, 1925, there were 24 admissions to hospital for cholera, all of whom recovered. I do not wish to imply by this that some new method of treatment has been devised which will still further reduce the mortality from this fell disease, but simply to bear humble testimony to the efficiency of the method of treatment by atropine, hypertonic saline and alkalies, introduced and advocated by Sir Leonard Rogers. In its application though we have been guilty of errors of omission and commission in that, in particular, the blood pressure and specific gravity of the blood are not recorded, we do not possess the necessary equipment for this purpose, nor is the temperature of the transfusion fluid adjusted to that of the patient. When cholera patients arrive in the midst of the ordinary routine work, professional and clerical, it is not always practicable to spare the time needed to follow the meticulous details devised by the author of the method and to do so requires whole time service and a specially trained staff. The most essential points in the treatment are to replace the fluid content of the blood and combat collapse. I cannot say that the present series of cases on the whole were any milder or less virulent than those in previous outbreaks to which reference will be made hereafter. At any rate I am prepared to own that good fortune attended our efforts in this particular instance.

Before dealing with the outbreak, a brief description of Goalundo may not be out of place. Goalundo, located on the river Padma below the confluence of the Ganges and Brahmaputra, is not a permanent station. Owing to the changes in the channels of the river the station frequently shifts several miles up and down stream according to where a connection can be made between the railway and river services. The place is 155 miles from Calcutta by rail and is the point at which a large number of passengers transfer to the various steamer services for the onward journey to Dacca, Mymensingh, Assam, Cachar, Sylhet,

admission was queried, pending a more detailed examination of her case. The child had not been anywhere away from Goalundo, the drinking water was obtained direct from the river which is the only source of supply to most of the inhabitants of these parts, and nothing but freshly prepared food had been eaten. Incidentally, with few exceptions the inhabitants of these parts are rice eaters. After the rice is cooked the pot is removed from the fire and a variable quantity of *cold* water, the nearest at hand and perhaps contaminated with the virus of cholera, is added. The liquid is drained off and the pot replaced near the fire to favour evaporation of moisture, assisting the process by occasional shaking. Would this be sufficient to destroy the virus and re-sterilize the rice? It was not till Case No. 2



was admitted that some clue was obtained as to the probable origin of the outbreak. During the 14th and 15th September, 1925, squally weather prevailed locally. A large number of fishing boats—light flat-bottomed craft manned by 2 to 6 or more fishermen—took refuge from the fury of the wind and waves in an area of shallow and almost stationary body of water marked "A" on the map, and bounded on three sides by the railway embankment, a raised footpath, and the

bazaar. It was ascertained that two and possibly more of those living on the boats during that time were attacked with profuse diarrhoea and vomiting. Instead of applying for relief at the hospital they sailed for home, an unknown destination. Such fishermen are not local inhabitants but visit this locality periodically during the fishing season. What their previous movements were, how long they had been here and whether they originally came from an infected area, presuming them to be cases of cholera, must now remain a mystery. The connection between those cases and the subsequent ones seems, however, to be fairly well established. From the outset the river water was strongly suspected of being the source of infection and the sequence of cases indicated on the map strongly supports that suspicion. The spread of infection through the agency of flies and infected particles of dust contaminating food supplies may safely be excluded on this occasion,—the former being conspicuously absent during the flood season—in view of the fact that every conceivable form of filth and rubbish in which they breed is consigned to the water, while such land as is above water is saturated with moisture and consequently there is no dust worth mentioning.

The area marked "No. 6 Bazar" in the sketch a few years ago formed the connection between the railway and river services when the river flowed in that direction. During the monsoon season there is still traffic between the railway and country boats. There is also a comparatively large bazaar and it is the home of many who carry on business or are employed in other ways at the ghats. My information is that the first reported case of cholera in this area occurred on the 28th September, 1925, as to whose movements, etc. nothing is known. Since then there have been 32 attacks and 20 reported deaths (21st October, 1925). It is fairly safe to infer that the outbreak there was not directly due to diffusion of polluted river water from the ghats where cholera was prevailing but through human agency. Case No. 21 was the only case admitted to hospital from this area.

Case No. 3 was the daughter of a railway employee living in quarters on the brink of the area of water marked "A" in the sketch. The railway colony is provided with tube and pucca wells. How then came this child to contract the disease, assuming the well water to be above suspicion? A visit to the quarter to investigate the case elicited the fact that the child often left the precincts of the house unknown to the parents. It was probably on such an occasion that feeling thirsty she drank of the water surrounding the quarters. In the house were found several receptacles containing water, some with clear and clean looking water said to have been drawn from the well, while others contained crude dirty water taken from near the quarters for cooking purposes; probably this also was drunk by the patient. In this case most of the places in and around the quarters known to have been fouled

by dejecta and vomited matter were promptly disinfected.

Diagnosis.—The diagnosis of cholera was made solely on clinical evidence. With the exception of a few patients cases who did not have all the characteristic signs and symptoms the remainder were admitted during the stage of collapse and presented the usual typical picture, viz.,—the initial diarrhoea of fluid faeces and vomiting of undigested food rapidly changing to copious motions and vomited matter "like water" as described by the patient, which subsequent inspection showed to consist of almost clear colourless fluid with a deposit of white flocculent or granular matter and accompanied by the usual concomitant signs and symptoms of that disease. Case 22 was the only doubtful case clinically. He gave a history of having obtained his water supply from the river and of frequent motions and vomit "like water" but on the day previous he had eaten stale rice and fish, his eyes and cheeks were sunken—the skin clammy, toes and finger tips shrivelled but his pulse was fair and subsequent inspection of his stools showed them to be not truly characteristic of cholera.

General routine procedure of treatment.—The quantities stated refer to adults, and for children to proportionately less. On admission atropine gr. 1|100 to 1|50, with digitalis 1|100 hypodermically—continued twice daily or oftener according to circumstances. An initial dose of calomel gr. iv. or v. combined with sodium bicarbonate, followed two hours later by $\frac{1}{2}$ gr. doses every half to one hour for 8 to 12 doses. The smaller doses are often continued on the day following admission, rarely longer. This is a rational procedure inasmuch as it assists in the elimination of the causal organisms and their toxins. Should the motions at the end of this time not show definite signs of improvement potassium permanganate pill grs. ii each are administered half-hourly or hourly for eight or twelve doses and repeated if the stools still do not improve. Hypertonic saline is given intravenously in quantities of three pints—occasionally 4 or 5. (Alkaline solution is given first when a history of complete suppression of urine is obtained.) After the first few ounces of saline have flowed into the vein, adrenalin solution (1 in 1,000) min. x to xv is added to the container—the barrel of a 4-oz. syringe. In second and subsequent transfusions one pint of the alkaline solution is given first followed by 2 pints of hypertonic saline with addition of adrenalin as before. Occasionally pituitrin, $\frac{1}{2}$ c.c. in very severe cases, is added.

In the present series none of the serious complications or sequelæ were present in a marked degree. In only one case was dry cupping resorted to and in ten others warm alkaline solution per rectum every two to four hours to assist in re-establishing the functions of the kidney.

The essential oils' treatment was tried in Cases 6, 7 and 17 with the results noted.

Patients on this and previous occasions complain of it as being too pungent and irritating.

Case 6, admitted at 8 a.m. in a condition short of collapse, was given atropine, digitalis and calomel as usual, then the essential oils mixture, a drachm every half hour for 5 or 6 doses. By 5 p.m. the patient was found collapsed, when hypertonic saline transfusion with small divided doses of calomel every hour for 6 doses was given.

Case 7, admitted 25-9-25, with cold and shrivelled extremities and perceptible pulse. Atropine and digitalis as usual. Essential oils' mixture as for No. 6. Urinary suppression followed. Dry cupping and warm alkaline solution per rectum. 26-9-25. Calomel gr. $\frac{1}{2}$ every hour for 12 doses, kaolin drink, cupping and alkaline transfusion per rectum repeated, followed by improvement.

Case 17, admitted 8-30 a.m. short of collapse. Essential oils' mixture every $\frac{1}{2}$ hour which he could not retain. Started on permanganate pills at 12 noon 1 every $\frac{1}{2}$ hour. On the second day no change in the character of the stools, pills continued. On the 3rd day motions liquid and containing bile. By 10-30 a.m. was collapsed. Saline transfusion, etc., and pills continued, tardy convalescence.

Year.	Admissions.	Deaths.	Mortality.
1915	73	45	61.64
1916	61	26	42.62
1917	55	18	32.73
1918	72	25	34.71
1919	322*	165	51.24
1920	32	7	21.87
1921	84	19	22.62
1922	37	7	18.92
1923	68	5	7.35
1924	34	7	20.85
1925 (up to 28-10-25)	44	4	9.09

* Principally famine-stricken tea-garden coolies.

For such gratifying results, in the absence of good conditions and nursing, in its true sense, the credit is due in particular to Sub-Assistant Surgeon Amrita Lal Chanda, the Medical Officer-in-Charge, on whom the brunt of the work fell, and to the staff generally for their valuable assistance.

Cholera outbreak at Goalundo 19th September, 1925 to 8th October, 1925.

ADMISSIONS FOR CHOLERA.

Serial Number.	Date of Admission.	Occupation.	Age.	Sex.	Caste.	No. of saline transfusions.	Result.
1	19-9-25	D/O Dry Store Vendor	5	F, ch.	H	1	Recovered.
2	22-9-25	Fisherman	24	M	H	1	Do.
3	22-9-25	D/O Railway employee	6	F, ch.	H	1	Do.
4	23-9-25	Boatman	42	M	M	1	Do.
5	25-9-25	Fisherman	20	M	H	1	Do.
6	25-9-25	Fisherman	40	M	H	1	Do.
7	25-9-25	Sweetmeat Vendor	30	M	M	Nil	Do.
8	26-9-25	Do	44	M	H	1	Do.
9	28-9-25	Railway Employee	45	M	M	2	Do.
10	Do.	Fish Nikari	22	M	H	1	Do.
11	Do.	Steamer Co. employee	25	M	M	2	Do.
12	Do.	Fisherman	26	M	H	1	Do.
13	29-9-25	Fisherman	45	M	H	1	Do.
14	30-9-25	Fish Nikari	55	M	M	3	Do.
15	1-10-25	Fisherman	24	M	H	2	Do.
16	Do.	Steamer Co. employee	55	M	M	2	Do.
17	Do.	Bird & Co.'s employee	45	M	H	1	Do.
18	Do.	Fisherman	26	M	H	1	Do.
19	2-10-25	Bird & Co.'s employee	25	M	H	2	Do.
20	3-10-25	Cultivator	30	M	H	2	Do.
21	4-10-25	Cooly from Jute Press	45	M	M	1	Do.
22	5-10-25	Cultivator	35	M	H	Nil	Do.
23	6-10-25	D/O Cultivator	9	M, ch.	H	Nil	Do.
24	8-10-25	W/O Steamer Co. (3 months employee pregnant-aborted, 16th October, 1925.)	35	F	H	2	Do.

The symptomatic treatment need not be referred to.—nothing but plain water, coconut water, kaolin drink (1 in 4) is allowed until the motions assume their normal character, and then barley water, whey, thin sago, soft rice with *ghole* and *dahi* onwards to normal diet.

COMPARISON WITH PREVIOUS YEARS.

As I have been associated with this institution for a year and a half (1914-15) and again from April 1919 to date and so also has Dr. Chanda since 1917, it occurred to me to compare collectively results with previous years and these are set out in the following table:—

THE OCCURRENCE OF URTICARIA IN THE TREATMENT OF MALARIA BY QUININE.

By Major T. A. HUGHES, M.A., M.D., D.P.H. (Dubl.),
M.R.C.P. (Lond.),

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CUTANEOUS eruptions, usually of an erythematous, scarlatina-form or urticarial nature, are among the toxic effects produced by quinine in certain people, and although they may occur without any other symptoms of cinchonism they interfere with the efficient treatment of malaria in such subjects. This is especially the case with urticaria, where itching may be so severe as to

be almost unbearable. On the other hand malaria may be the cause of an urticarial rash which appears with each paroxysm, or in periodic outbursts when the disease is latent or its clinical features not characteristic. Here the administration of quinine will usually clear up the skin condition along with the other manifestations of malarial infection, although in some cases the cutaneous eruption is aggravated by each dose of the drug. In some of these cases it is probable that quinine by itself would produce urticaria, while in others the malarial infection has sensitised the skin to the action of quinine.

Lewis and Grant (1924), as a result of observations on the cause of factitious urticaria and the wheals produced by burning, conclude that there is in the skin "a single and organised mechanism of defence against injuries of all kinds." This consists of (a) a local primary dilatation of the minute skin vessels independent of arteriolar dilatation and of the nervous system; (b) a surrounding flush due to widespread dilatation of the arterioles of the skin and dependent on a local nervous reflex; and (c) an output of fluid into the tissues due to increased permeability of the vessel walls and not controlled by nervous influence. The agent setting this mechanism in motion is a chemical substance with a histamine-like action derived from the skin, and it is possible that certain drugs which produce urticarial eruptions act in a similar manner. That an excitable nervous system is also a factor in some urticarias is seen from the fact that an outbreak of wheals occurs as a result of nervous excitement in some people and has been recorded in exophthalmic goitre and the lightning pains of tabes. An urticarial eruption could also be produced by stimulation of such a nervous system by drugs. The classification of drug eruptions given by Jonathan Hutchinson (1911) follows these lines. He divides drug rashes into (1) those that result from direct action of the drug on the skin by absorption from outside, (2) those that are due to the direct action of drugs carried to the skin in the blood, and (3) those that are probably produced through the central nervous or vasomotor system. The eruptions in class (3) are usually erythemas or urticarias or combinations of these and are mainly symmetrical. Quinine rashes would seem to belong mostly to the last class. Two cases are here recorded in one of which quinine, given in the treatment of malaria, produced a marked urticarial eruption all over the body, while in the other it aggravated a generalised urticaria already existing as a result of a malarial attack.

Case 1.—Miss G., a nurse in the Mayo Hospital, was warded with a history of rigor and a rise of temperature to 100.6° . The spleen was enlarged $\frac{1}{2}$ inch below the costal margin, all other organs being apparently normal. Malarial parasites were not found in a thin blood film, but the clinical history and symptoms pointed to malaria. The patient stated that she had

never had malaria before and that she had never taken quinine. The nervous temperament did not seem to be in any way abnormal. On admission the usual purgative was given followed by "quinine and alkali" mixture (Sinton 1923; 1923a), ten grains of quinine being given on the first occasion. This was followed, in about 20 minutes, by a generalised urticarial rash with intense itching, the wheals varying from $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter. The face was swollen and the eyes congested and watery. The patient also complained of an itching sensation in the mouth, pharynx, and eyes, as well as frontal headache and buzzing in the ears. There was no dimness of vision and no deafness. These symptoms lasted for two hours when they completely disappeared. The temperature came down to normal. The dose of quinine was then cut down to five grains, but urticaria, etc., resulted as before after each dose. The rash was not alleviated or prevented by bromides or calcium lactate. The temperature remained normal or sub-normal except for a rise to 100.6° on the evening of the second day. On the third day quinine was given in three five-grain doses and 5 minims of adrenalin hydrochloride (1 in 1,000) were injected hypodermically about 5 minutes after each dose. Slight buzzing in the head was complained of, but there was no rash, no itching, and no headache. On succeeding days the same treatment was continued but the quinine was gradually increased to ten grains thrice daily. No untoward symptoms appeared. The patient was discharged to duty on the 7th day, having been free from fever for 6 days and from urticaria for 4 days. The spleen had diminished in size. The patient was not menstruating during her illness. On the 8th it was found that urticaria did not follow the ingestion of ten-grain doses of quinine even when adrenalin was omitted, the susceptibility of the skin to that drug having disappeared. Slight shakiness was noticed after each injection of adrenalin.

Case 2.—Patient (Miss H.), aged 51, was admitted with a generalised urticarial rash which was very irritable. There was a history of chronic malaria and dysentery, and the rash was said to appear with the onset of any acute illness and to be aggravated by quinine. The spleen was two inches below the costal margin. Other organs were healthy, there being no symptoms of dysentery and no pyrexia. The blood showed numerous subtertian rings. No pathogenic entamoebæ or cysts were found in the stools. The patient remained in hospital 4 days, on the second of which she had a slight rigor with a rise of temperature to 100.8° , the fever lasting a couple of hours. Defervescence occurred with sweating. On admission the usual antimalarial treatment was started, but after the first dose (ten grains) of quinine the rash became much worse. Sweating also aggravated the rash. Adrenalin administered as before did not benefit the skin condition but prevented its aggravation

by quinine. On the other hand calcium lactate in 30-grain doses seemed to bring relief but bromides were without effect. The rash disappeared on the fourth day after admission and the patient left hospital.

Experiments on the effects of quinine on the sugar concentration of the blood (Hughes 1925) showed that this drug in antimalarial doses in man usually caused a fall in the blood sugar, and that hypoglycæmia is often produced in rabbits by toxic doses when sympathetic glycolysis is prevented by ergotoxine. Evidence was adduced which indicated that this effect is due to increased liberation of insulin. Clarke (1924) demonstrated that parasympathetic stimulants produced a fall of blood sugar in rabbits, and his results suggested that this was the result of increased secretion of insulin brought about by stimulation of the vagus. The hypoglycæmic effect of quinine may similarly be due to parasympathetic (vagal) stimulation. From the fact that in the cases here recorded the effect of quinine on the skin was abolished by a sympathetic stimulant, it is concluded that this drug also produces urticaria by parasympathetic stimulation. In both cases the skin vessels seemed to have been sensitised to the action of quinine by the toxin of malaria. This by itself in the second case produced an eruption which was not affected by adrenalin and which, therefore, was most likely due to direct action on the vessel walls.

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NOTES ON MALARIA IN THE AGENCY TRACTS, MADRAS PRESIDENCY.

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THE Agency Tracts of the Madras Presidency are hilly regions mostly below 4,000 feet above sea-level, with a very cold winter, a very hot summer, and a rainy season accompanied by extremely heavy downpours of rain; in fact the climate as a whole is one of extremes. Swampy areas and waterlogging are very common, whilst the hilly region in general is covered with forest and thick vegetation. When the subsoil water-level rises at the end of the rains, the fever season sets in and persists throughout the winter.

The majority of the population perhaps are afflicted with malaria, though the disease is not usually of a severe character, and during the hot weather cases are fewest in number and mildest in type. In the Jeypore Agency in Vizagapatam District, however, I have come

across fatal cases of cerebral type. Such cases shew an onset with constipation, followed by chill and fever, usually between 10 A.M. and 12 noon. The patient loses consciousness; the body, at first warm, becomes cold and the pulse more and more feeble. The rectal temperature, however, remains high.

At first I treated such cases by intramuscular injections of quinine, at a dose of 10 grains a day. Later intravenous injections of quinine were tried, but in severe cases these appeared to increase collapse. I finally resorted, therefore, to intramuscular injections of quinine, given two or three times daily. An illustrative case may be cited:—

The patient was a Malabar police constable engaged on active military service against rebels in the Agency Tracts in 1923. He first had a severe attack of malaria with a temperature of 105°F. After oral treatment he appeared to be doing well and to be recovering. A week later, on going to get water to drink from the kitchen, he was found unconscious on the floor, tossing about and groaning. The sub-assistant surgeon in charge, not having previously seen such a case, took it to be one of cerebral hæmorrhage and treated the patient accordingly. The attack occurred about 11 a.m. and the patient was brought down to the Base Hospital by ambulance car and admitted about 1 a.m. that night. He was then almost unconscious, groaning, and restless, with a rectal temperature of 104.5°F, the body cold and clammy, the pulse 56 per minute, of feeble and flickering tension. Typically—in other words—a case of cerebral malaria.

I started with heart stimulants, enemata, croton oil by the mouth and an injection of 10 grains of quinine intramuscularly. Three hours later the patient had passed some motions in bed, but the condition was otherwise the same. Four hours later a second intramuscular injection of quinine was given. Mustard plasters were applied to the nape of the neck and to the calves. Lumbar puncture was carried out and a little fluid withdrawn. Three further intramuscular injections of quinine were given at four hourly intervals. The treatment given aimed at (a) killing off the malarial parasites; and (b) reducing the cerebral congestion. He was convalescent within two days and recovered completely.

Certain miscellaneous observations with regard to malaria in this district may be of interest. In general, women in this district appear to suffer less from malaria than do the men. Further there is a settled conviction among the male inhabitants of the district that to take quinine leads to sexual impotence; one patient having informed me that he actually used quinine injections to suppress sexual desire. As malarial fever, however, is far more likely to lead to sexual impotence than quinine administration, the latter is the lesser of two evils.

The women in the Agency Tracts are generally clothed in a saffron coloured garment and wear yellow *sarees*. It is known that mosquitoes are attracted by black clothing and repelled by yellow clothing; possibly the clothing of the women in saffron yellow may have something to do with their relative immunity from malaria as compared with the other sex.

A belief is prevalent in the locality that cooked onions, taken before each meal, confer a certain amount of freedom from fever on those who eat them. The amount to be taken is about half a

dozen onions a day. Lemon juice beverage is also said to be useful as a prophylactic. Bachelors and married men living apart from their wives and families also appear to be less susceptible to malaria than do married men residing with their families. A daily walk of 8 or 10 miles is held to be a useful precautionary measure locally against infection with malaria.

ON A SPECIES OF *TRICHOMONAS* PREVALENT IN CALCUTTA.

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THE question of the number of species of the genus *Trichomonas* parasitic in the intestine of man may seem to be an academic one, yet it is in reality not so, as its solution may possibly be intimately related to the pathogenicity or non-pathogenicity of this parasite to man.

The type species of the genus of flagellate protozoon, *Trichomonas*, is *Trichomonas vaginalis* Donné, 1837, stated by Reuling (1921) upon a careful study of it to possess four anterior flagella arising from the anterior pole and passing forward. Davaine in 1854 was apparently the first person to see *Trichomonas hominis*, the intestinal *Trichomonas* of man, in the stools of a patient suffering from typhoid fever. He correctly described its undulating membrane and the postero-lateral projection from the body of the parasite of the terminal free portion of its trailing, posterior flagellum. In 1860 he gave a drawing of the parasite, reproduced by Kofoid (1920), but shewing only one anterior and one posterior flagellum. He applied to it the name *Cercomonas hominis* (variety B). Lambl (1860) re-discovered *Trichomonas hominis* in its dying and pseudo-amœboid phase in stale stools, but mistook it for an amœba,—a mistake which has been not infrequently repeated in the literature, notably by Castellani in his description of dying *Trichomonas* as *Loëschia undulans* Castellani, 1905.

It is a little difficult at this date and with the literature at my disposal to discover who first pictured *Trichomonas hominis* as a flagellate protozoon possessing a group of three anterior flagella arising from one or more basal granules at its anterior pole, and a separate posterior or trailing flagellum, anchored to the body of the parasite by an undulating membrane. Leuckart (1879) gave a description of the parasite to which I have not had access. Doflein (1916) is very cautious as to the number of anterior flagella possessed by the parasite; he regards three as typical; but considers that individuals may be encountered with four anterior flagella, the fourth possibly derived from the trailing, posterior flagellum by detachment from its undulating membrane. Wenyon and O'Connor (1917), working at Alexandria during the War, are more definite; they state that three, four or five flagella

may be seen to arise from the anterior pole of the parasite and to pass forward, but that four flagella is the most common finding. (To a considerable extent the intertwining of the group of flagella so arising from the anterior pole may be responsible for many mistakes, and render the exact number of anterior flagella difficult to count.)

Dobell—(Dobell and O'Connor, 1921 p. 68, footnote)—is far more definite upon the subject. Working at Hampstead during the War, upon an almost unlimited supply of material, he concludes that the commonest variety encountered had four anterior flagella, but that individuals with three and five anterior flagella are not infrequently to be encountered. He concludes that the contentions of other workers that three different genera or sub-genera, *Tritrichomonas*, *Tetratrichomonas*—or *Trichomonas, sensu strictu*, since it conforms to the type species, *T. vaginalis*,—and *Pentatrichomonas* should be established for different races having respectively three, four or five anterior flagella (in addition to the posterior, trailing flagellum of the undulating membrane) are unnecessary; such individuals appear to be merely variants from the type species.

Despite the very great weight of Professor Dobell's authority, the matter does not appear to be as simple as it sounds. The number, disposition and specialisation in function, etc., of their different flagella have been made the basis for the generic classification and differentiation of the Polymastigina, and accordingly Kofoid (1920) reserves the genus *Trichomonas* for the variety of parasite with four anterior flagella. As this leaves the variety with three anterior flagella unnamed, he proposes the generic name *Tritrichomonas* for it.

With regard to the genera,—sub-genera, variants or whatever they are—which possess three and four anterior flagella respectively, no claims for pathogenicity worth considering have yet been put forward. With regard to the penta-flagellate type, with five anterior flagella, the case is different.

Attention to the genus—(sub-genus, species or variant)—*Pentatrichomonas* was first drawn by Derrien and Raynaud in 1914. They found it in considerable numbers in the stools in a severe case of dysentery; the infection appeared to resist all forms of medication from December 1st, 1913, till February 1st, 1914, but was then apparently cured by the combined oral and rectal use of turpentine; it is stated that no other parasites were found in the stools. A short but clear description of the parasite is given, and 5 anterior flagella are described of length 10 to 17 μ . They proposed for the parasite the name *Hexamitus ardin delteilii*. Mesnil (1914, 1915), however, shewed that *Hexamitus* was already pre-occupied, and proposed *Pentatrichomonas ardin delteilii* (Derrien and Raynaud), 1914.

Chatterji (1915) discovered the same parasite in the stools of a patient with chronic dysentery

in Calcutta, and published his description of it independently before Derrieu and Raynaud's paper was brought to his notice. Recurring to the same subject in 1917, he records 32 cases of chronic dysentery in Bengal in which he considered *Pentatrachomonas* pathogenic, and notes that he had not found true *Trichomonas*—presumably meaning the tetra-flagellate form—in Calcutta.

Subsequent to the appearance of the papers by Derrieu and Raynaud and by Chatterji, a considerable number of observers have claimed pathogenicity for *Pentatrachomonas*, notably Haughwout (1918, 1919, 1920), who reports on its prevalence in Manila, and on its ingestion of red blood corpuscles.

Wenyon and O'Connor (1917, p. 79) remark with regard to their observations in Alexandria during the War, "the commonest type seen by us has been *Tetratrachomonas*, though three-flagellar and five-flagellar forms have been seen, each on one occasion." They are clearly of opinion that *Trichomonas* is not pathogenic; "it is illogical to call such cases *Trichomonas* diarrhoea, while there is no excuse whatever for the use of the term *Trichomonas* dysentery. The cases of dysentery in which *Trichomonas* has been present have been cases of bacillary dysentery."

Dobell—(Dobell and O'Connor 1921, p. 68, footnote)—remarks "I regard these so-called sub-genera rather as varieties." In a critical review of the literature, he regards the evidence in favour of the pathogenicity of *Trichomonas* as highly unconvincing; the fact that it ingests red blood corpuscles when presented to it is not evidence of its tissue-invading properties, and the strongest evidence in favour of its pathogenicity is the post-mortem finding by Wenyon (1920) of *Trichomonas* in the lumen of the glands of Lieberkühn, with ruptures of the gland epithelium, and trichomonads scattered in the inter-glandular loose connective tissue. Wenyon notes, however, that the trichomonads were distributed regularly through the tissue, that there was no cell or tissue reaction; and he considers that the trichomonads had penetrated the gut epithelium only shortly before the death of the patient. He concludes "The present paper shows that *Trichomonas* may invade the tissues of the intestine, but whether this is evidence of its pathogenicity or not, future work alone will show. So little is known at present that any expression of opinion would be merely valueless guess work."

That *Trichomonas* may occasionally pass from the lumen of the gut of a living animal into its blood stream was shown by Chatton (1920) who succeeded in obtaining a culture of it from the blood of a gecko which had an intestinal infection with the same flagellate.

Writing on the nomenclature of the human intestinal flagellates in 1920, Kofoed mentions only *Tritrachimonas*, and *Trichomonas* with four anterior flagella. In 1923, however, Kofoed and

Swezy reported three cases of infection with *Pentatrachomonas* in man, in which they considered the flagellate to have been pathogenic. "In our experience," they write "the common trichomonads of the human intestine, urogenital tract, and mouth all have four anterior free flagella. In case only three are seen at first, a fourth can be found if the material is so prepared as to be adequately examined. In our experience failure to find the fourth has been due to the belief that three is the normal number, or to inexperience in analysis of specimens, or to the disadvantageous position of one of the four flagella, as, for example, when it is hidden under the body. Fundamentally, the reason lies in a failure to observe the differential behaviour of one of the anterior flagella." They describe the five free anterior flagella as distributed into two groups; four arise together from a distal basal granule and beat together at a slow rate. These may easily be mistaken for only one, two or three flagella unless carefully observed, as their movement is synchronous and they tend to intertwine. The fifth flagellum arises from a different basal granule, passes forward and laterally, quite independent from the other grouped four, and beats with a much faster and independent rhythm. Finally the sixth, or posterior trailing flagellum, passes backwards along the margin of the undulating membrane. It is essentially by the different behaviour of the two groups of flagella that *Pentatrachomonas* is differentiated by these authors as a separate genus; but it appears to be more resistant than *Tritrachimonas* and *Trichomonas*, *sensu strictu*. It ingests red blood corpuscles, resists emetine preparations and arsenical drugs, survives in liquid stools for 24 days, in tap water for 3 days and in normal saline for 13 days. No cysts have been observed, and the parasite is readily cultured in 10 per cent. rabbit serum in Locke's solution both at room and body temperatures. In the three patients in whom Kofoed and Swezy encountered *Pentatrachomonas* infection they consider that there is full evidence that the parasite caused an intractable diarrhoea; and they further believe that epidemic infections with this parasite may occur when drinking water is infected, as reported by Escomel (1919).

EXPERIMENTAL WORK.

Such being the position, it is obvious that much further work upon the trichomonad parasites of man is wanted, and during the past year special attention has been paid to these parasites in Calcutta.

During these six months *Trichomonas* infection has been encountered in 12 diarrhoeic stools, 7 semi-fluid stools, and 4 more or less formed stools; or in all 23 times. On each of these occasions a positive culture of *Trichomonas* was obtained from the stool and the cultures were examined in the fresh state, by dark ground illumination, and in stained preparations, using

osmic acid fixed, Giemsa stained films, and fixation by Schaudinn's fluid, followed by iron hæmatoxylin staining.

In every one of these 23 instances the parasite encountered has conformed to Kofoid and Swezy's description of *Pentatrichomonas*. It has five free anterior flagella, four of which are clustered together and beat with a rhythm different from that of the fifth, anterior free flagellum. Since commencing these observations and counting the flagella with care and accuracy I have not once encountered the types with three and with four anterior flagella.

This observation would seem to confirm that by Chatterji (1917) that the prevalent type of *Trichomonas* infection in Calcutta is with *Pentatrichomonas*.

With regard to the pathogenicity or otherwise of *Pentatrichomonas*, at present nothing definite can be said. It would be a mistake to make any assertions upon scanty material. The parasite has been seen to ingest red blood corpuscles, both in freshly passed dysenteric stools, and in cultures. In 5 of the 23 stools—(all dysenteric)—vegetative *Entamoeba histolytica* was present; these cases were undoubted cases of amebic dysentery, and yielded to emetine therapy. Further, in previous years I have frequently seen motile *Trichomonas* in the stools from cases of bacillary dysentery—as proved to be such by culture;—in fact one had come to regard it as a common finding in bacillary dysentery, where the alkaline character of the stool and its richly nutritious content would provide excellent pabulum for the parasite. Before any claim to the pathogenicity of *Pentatrichomonas* can be verified, it will be necessary to have sets of observations extending over a large number of patients and a long period of time, in which repeated examinations have been made to exclude the possibility of infection with *E. histolytica*, and repeated cultures taken to exclude the bacillary causes of diarrhoea and dysentery. To find a parasite in a dysenteric stool is not evidence that the parasite is the cause of the dysentery. There are such things as Koch's postulates, although many workers seem to ignore them. On the other hand the careful work of Kofoid merits serious attention, and further and systematic investigation is called for.

In none of the human trichomonads has any encysted form so far been discovered. The cyst of *T. batrachorum* of frogs has been described by Dobell (1909), and that of *T. caviae* of the guinea-pig by Brug (1917); but all the earlier descriptions of cysts of human *Trichomonas*, as Dobell remarks, and as the figures in different protozoological atlases clearly shew, are really figures of *Blastocystis* or of *Chilomastix* cysts. *Blastocystis hominis*, it may be remarked, is a serious drawback in all cultural work with *Trichomonas*; if present, it will overgrow a *Trichomonas* culture in a couple of days and kill off or starve out all the flagellates.

It was thought that placing the parasite under conditions of adverse environment in culture might cause it to encyst. Luxuriant cultures were obtained by inoculating tubes of Row's culture medium for *Leishmania* with portions of mucoid stool rich in *Trichomonas*. (To prepare Row's medium 10 c.c. of rabbit or human blood is taken, defibrinated, and added to 90 c.c. of distilled water to lake the blood. One volume of this laked blood solution is added to 2 volumes of sterile 1.2 per cent. saline). On incubation at 37°C., rich cultures of *Trichomonas* are obtained, with either rabbit or human blood.

(a) One such culture was placed in a desiccator at 37°C. and observed daily for 3 days. The flagellates remained motile and active.

(b) A second culture was transferred from 37°C. to the 22°C. incubator.

(c) A third culture was transferred from the 37°C. incubator to the refrigerator chamber at freezing point.

In (b) and (c), observed daily, no motile flagellate was found after the first 24 hours; they all appeared to have died and many of them were disintegrated. In none of (a), (b) and (c) were any encysted forms encountered. Further, whereas a temperature of 22°C. appears to be rapidly fatal to the parasite, one culture strain survived for 63 days at 37°C. on subculturing every third day in Row's medium.

It is suggested by Kofoid and Swezy (1924) that possibly *Pentatrichomonas* infection may pass from man to man in its motile phase, and not through the channel of encystment at all; that its long period of survival in tap water, (3 days), or in passed stools, (5 to 24 days), may carry the flagellate in its motile phase *via* contaminated water, etc.; from man to man. Hitherto it has generally been held that infections with the intestinal protozoa pass from man to man by the "contaminative cycle of Minchin," the cysts in passed faeces constituting the channel of infection, and being the forms in which these parasites are enabled to tide over their period of sojourn in the adverse environment outside the body. Kofoid's view of the possible direct infectivity of the motile, vegetative phase is therefore somewhat revolutionary. Nevertheless it merits attention, for many years' investigation of *Trichomonas hominis* by many different workers have failed to reveal its cyst.

EXPERIMENTAL INFECTION OF KITTENS.

To test the validity of this view "clean" laboratory animals or human volunteers are necessary, i.e., such as have shewn on repeated examination of their stools no infection with natural intestinal protozoa, or at least from whom it is reasonably certain that natural *Trichomonas* infections are absent. Such "clean" animals are very difficult to obtain, since very numerous species of animals are parasitized with *Trichomonas*. Kessel (1923) has described a method

of freeing rats of their natural intestinal entamœbæ and obtaining "clean" animals; 128 rats were caged and fed for two days on bread soaked in a saturated solution of magnesium sulphate. Their stools were examined on the first and second days after these feeds; they were then killed and the whole of the intestinal tract examined. In only 4 were entamœbæ detected at the post-mortem examination where the previous two examinations had failed to shew entamœbæ in the stools. From the table published in Kessel's paper, however, the method appears to be less successful in flagellate infections, and, in any case, one doubts whether the method is a completely reliable one for this purpose. If two days of drastic treatment with magnesium sulphate will clear the intestine of an animal of all contained entamœbæ, the method should afford the easiest way also of ridding man of entamœbic infections.

The handiest animals available being kittens, these were selected. It is almost impossible to get an animal species in which natural *Trichomonas* infections are known not to occur, and Wenyon and O'Connor (1917) note the occurrence of natural *Trichomonas* infections in cats in Alexandria. On the other hand, during the course of several years of examination of kittens' stools in Calcutta such a natural infection of kittens has only very rarely been encountered; the commonest intestinal protozoa in kittens appear to be *Coccidia*; entamœbæ and flagellate protozoa being very rare or almost completely absent.

Six kittens were selected and kept on a milk diet for three days, their fæces being examined daily. Two shewed coccidial infection, but the other four shewed no protozoal infections. As, however, I have sometimes noticed in the case of rats that no protozoa may be encountered in the stools, although there may be a heavy infection in the cæcum two kittens—(Nos. 1 and 2)—were killed, as controls, and the contents of their cæca thoroughly searched. No protozoa were found. Thus it appeared to be reasonably probable that the other four kittens were free from natural *Trichomonas* infection, or that such infection, if present, would only be present in scanty numbers.

To kittens Nos. 3, 4, 5 and 6 in each instance 30 c.c. of a very rich culture of human *Pentatrachomonas* was fed. Two of these kittens took this culture in milk voluntarily; in the other two it had to be administered by a stomach tube.

Kitten No. 3 was chloroformed 20 minutes after the feed, and the contents of its intestine examined at different levels, and cultures taken. Very active and very numerous *Pentatrachomonas* were found swarming in the stomach and a few about 5 cms. below the pylorus, but none at a lower level.

Kitten No. 4 was chloroformed 45 minutes after the feed. Numerous and very active

Pentatrachomonas were found about 21 cms. below the pylorus and 48 cms. above the cæcum, but none in the cæcum or rectum.

Kitten No. 5 was chloroformed three hours after the feed. Its cæcum was found to contain very numerous and active *Pentatrachomonas*, but there was no infection in other portions of the gut. The infection in fact appeared to have become especially localised in the cæcum.

In all three animals cultures were taken from those parts of the intestine which were found to be positive at examination; and in each instance a luxuriant growth of *Pentatrachomonas* was obtained, identical in morphology with those of the original strain. The parasites appeared to have retained full vitality as shewn by their staining reactions, movements, and growth on culture, and not to have deteriorated at all in transit through the gut.

After being fed on 30 c.c. of a similar culture, kitten No. 6 was kept as a control; its fæces being examined daily. For a month no protozoa were found in its stools. It then suddenly developed dysentery, and its stools shewed numerous coccidial oocysts, and scanty *Trichomonas*. On culture this material again yielded a good growth of typical *Pentatrachomonas*. After passing through this attack of dysentery, the kitten recovered, and is now—a month later—in good health, whilst no protozoa can be detected on examining its stools.

As a still further control to these experiments, it was decided to feed kittens with a coprozoic flagellate. As Dobell and O'Connor (1921) point out, such flagellate protozoa as *Bodo* may not infrequently be met with in the examination of human fæces. They are not true parasites of the human intestine, however, but accidental visitors either to the gut or to the bedpan; having a special affinity for a fæcal environment, and being coprozoic in habit.

A rich culture of a strain of *Bodo* isolated from the stools of a cholera patient having been obtained, to each of kittens Nos. 7 and 8 fifty c.c. of this culture was administered by the stomach tube. Kitten No. 7 was killed one hour later, No. 8 was killed one and a half hours later. Their intestinal contents were searched. In the case of No. 7 a very few motile *Bodo* were still present in the stomach, but none were seen elsewhere; in the case of No. 8 no protozoa could be detected at any level. Cultures taken for *Bodo* from the stomach, duodenum, jejunum, ileum and cæcum of both kittens yielded entirely negative results.

Thus it will be seen that in the case of *Pentatrachomonas*—a true parasite of the human intestine—the experiments shewed that actively motile and viable trichomonads passed unchanged through the whole length of the gut, settled in the cæcum, and appeared to establish a localised infection therein. In the case of *Bodo*—a coprozoic flagellate for man, and not a true

ant of the human intestine—the flagellates were destroyed in the gut.

CONCLUSIONS.

Whilst much further investigation is called for, it seems to me permissible to draw the following conclusions:—

1. The prevalent type—(or genus or sub-genus)—of human intestinal trichomonad in Calcutta is *Pentatrichomonas ardin delteili* (Derrieu and Raynaud), 1914. This confirms a previous similar finding by Chatterji (1917); and, if read in conjunction with the findings of other workers of recent years, appears to afford evidence that *Pentatrichomonas* is a parasite with a tropical distribution, whereas *Trichomonas*, *sensu strictu*, is a parasite rather of temperate zones.

2. As to its pathogenicity or non-pathogenicity to man, nothing definite can yet be said.

3. It can be readily cultivated in Row's hæmoglobin-saline medium at 37°C.; at 22°C. and lower temperatures cultures die out within 24 hours. A strain has been kept alive in Row's medium by sub-passage every third day for 63 days.

4. When rich cultures of this parasite are fed to kittens, viable flagellates pass unchanged through the stomach and intestine and settle in the cæcum, where they appear to be able to establish a localised infection. The test for the viability of these forms was by culture.

5. This appears to confirm Kofoid's suggestion that *Pentatrichomonas* infection in man may be acquired,—not by swallowing cysts, since the cumulative work of many investigators has failed to discover such cysts,—but by ingestion of the flagellate in its motile and vegetative form.

6. The behaviour of *Bodo*—which is not a true parasite of the human intestine, but a coprozoic flagellate,—in kittens is entirely different; it appears to be rapidly destroyed in the gut.

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SOIL ACIDITY AND SURVIVAL OF HOOKWORM LARVÆ. A CRITICAL COMMENTARY.

By Dr. L. FABIAN HIRST, M.D. (Lond.),
 City Microbiologist, Colombo.

AN article in a recent issue of this journal by Dr. A. C. Chandler on soil acidity and survival of hookworm larvæ begins as follows: "It is a prevalent opinion that acidity in soil has a tendency to shorten the life of infective hookworm larvæ. Hirst (1924), for instance, says "a markedly acid reaction is also most unfavourable to the continued survival of hookworm larvæ" and remarks that the most favourable pH reaction for the development of the larvæ in cultures from faeces requires investigation."

Dr. Chandler assumes, in my humble opinion quite unjustifiably, that soil acid exerts its main effect in the infective stage of the life history of the larva. His whole investigation is based on this erroneous assumption.

As far as I know, no competent authority has hitherto suggested that the degree of acidity ordinarily met with in soil has any marked effect on hookworm larvæ, once they have developed to the infective stage.

There are two stages in the development of hookworm larvæ outside the human body; a cultural stage, lasting about seven days under tropical conditions, during which the larvæ absorb nourishment, grow, and develop; and a mature infective

stage, during which they are usually ensheathed and incapable of absorbing further nutriment from the faeces-soil admixture. Well grown infective larvæ can probably live up to six months under average tropical conditions; possibly much longer under specially favourable circumstances.

In the brief cultural stage the larvæ are especially vulnerable to physical agencies such as high acidity. These agencies, moreover, are also liable to impair the vitality of the developing ovum. On the other hand the mature larvæ are well known to be highly resistant to the action of a variety of disinfectants and other physical agencies generally harmful to living protoplasm.

The newly hatched larvæ are much more easily killed than either eggs or infective larvæ. (Cort 1921.)

In my paper under consideration I make only a passing allusion to the question of the effect of soil acid on hookworm larvæ. Dr. Chandler will find two additional references to the same subject in my Annual Report for 1923 in which I point out that the favourable influence of humus (Stoll 1923) as a nutriment for hookworm larvæ may more than counterbalance the effect of a low degree of associated acidity.

At the suggestion of the Colonial Advisory Committee I have undertaken to give the hookworm section of this report wider publicity elsewhere.

I am grateful to Dr. Chandler for drawing my attention to a possible misinterpretation of my meaning.

I shall be careful to point out explicitly that any agency directly affecting the viability of growing hookworm larvæ may indirectly influence the length of life of the adult infective larva.

It should, however, be clear from the context of the remarks quoted by Dr. Chandler and from the general tenor of my introduction, that I refer to the action of soil acid on the survival of hookworm larvæ under natural conditions.

The expression "hookworm larvæ" covers the whole history of the larva from its emergence from the ovum to its death or its penetration through the skin of man.

I mean exactly what I say.

The expression "mature infective larvæ" is frequently used in contradistinction throughout my papers.

If Dr. Chandler will turn again to the protocols of my experiments on the survival of hookworm larvæ amidst infected earth in baking pans, he will note that the ova-containing faeces were mixed with the soil under experiment, so that my figures for larval survival shown in Appendix III cover the period of egg hatching, and larval growth, in addition to the mature infective stage. In other words the conditions of these experiments represent what actually takes place in nature.

Soil acid is usually derived from either the humic group of acids or acid aluminium salts. If there be much decomposing vegetable matter

the oxidation of sulphuretted hydrogen may give rise to temporary traces of free sulphuric acid. Owing to the low ionisation of the acid aluminium salts it is probable that they would behave as a base in the presence of excess of humus, so that where both substances were present together their acid effect would not be exerted simultaneously.

Dr. Chandler does not give the chemical analysis of his experimental soils, but judging from the low nitrogen content shown by such analyses of Assam soils as I have seen, the acid under consideration is derived from aluminium salts. The highest acidity reached in Dr. Chandler's experiments was pH 5.2. Soils from the Straits Settlements may easily reach an acidity of pH 4.0. The figures 5 and 4 are logarithmic. They are minus powers of 10, i.e., the hydrogen concentration represented by pH 4 is ten times greater than that corresponding to pH 5.

It is necessary to bear in mind that a change in reaction may be merely indicative of other changes much more significant from the point of view of the life of hookworm larvæ, such as an anaerobic as opposed to an aerobic type of fermentation of organic matter.

It does not necessarily follow that it is the acid itself which exerts the devitalising action. It may be some other agency usually associated with distinct acidity.

Appendix I of my paper, containing the analyses of my soil by the Government Agricultural Chemist, gives the pH reaction of my experimental soils. Soils B and D had an initial acidity of pH 5.4 associated with 6.7 per cent. humus, 7.6 per cent. oxide of alumina and 1.34 per cent. lime in a combined form. The highest acidity reached in the Calcutta experiments was two degrees more acid than the Colombo soil. The larvæ in these two experiments with soils B and D lived as long as 124 and 120 days, respectively. The infective larvæ added to Dr. Chandler's moist acid soil lived 81 days on the same basis of calculation.

As a matter of fact the reaction of a soil-faecal mixture depends largely on the nature of the faeces. If they are derived from human beings fed on a vegetable diet, the products of decomposition are highly acid. (Stoll 1923.)

Stoll has suggested that the acid condition of human manure is a hookworm control asset. But human faeces may be alkaline.

The results of some of my experiments show a greater longevity of hookworm larvæ than has been obtained hitherto by any other worker in the tropics.

I attribute this unusual longevity to my good fortune in obtaining a supply of exceptionally well nourished larvæ. Optimum larval survival implies optimum conditions for larval production. In other words the longevity of hookworm larvæ depends primarily on good cultivation.

This is the main contention of my paper which includes the following sentence. "It follows,

therefore, that larvæ cultivated from human fæces by an unsuitable method would be delicate and unlikely to survive for any length of time."

To avoid further misunderstanding, I will endeavour to show how I was led to this conclusion. First it will be necessary to refer as briefly as possible to the laws of disinfection. Chick (1908) showed that the course of action of a given concentration of disinfectant on bacteria may be exhibited by a curve similar in form to that expressing the course of a unimolecular reaction in chemistry, so that if n^1 and n^2 = numbers of bacteria, and t_2 and t_1 = the respective times; the formula becomes

$$\frac{1}{t_2 - t_1} \log \frac{n^1}{n^2} = k,$$

k being a constant.

In practice this ideal formula has to be modified to meet the operation of varying age of the bacteria, the younger forms being the more resistant. Similarly a logarithmic relationship holds good for varying concentration of disinfectant and time taken to disinfect. Also reaction velocity increases with temperature in a manner similar to a chemical reaction. Similar laws appear to govern the action of other deleterious agents such as bacteriolysins.

In the case of hookworm larval development the matter is complicated from the start by the fact that the eggs as passed in the fæces differ between themselves in viability. Then the larvæ may be competing among themselves for the available nourishment. They may also differ in respect of the amount of oxygen available in various portions of the soil. And doubtless other factors capable of effecting larval vitality will enter into play. Other things being equal, however, the deleterious action of such a substance as an acid will in all probability exert itself in much the same manner as a disinfectant acting on bacteria. Some of the eggs will die, some of the developing larvæ will fail to reach maturity, while those that do mature will have their vitality affected in varying degrees. In such a case we may expect the influence of unfavourable cultural conditions to show itself in a low average longevity of the infective larvæ and a rapid falling off in larval numbers.

Suppose on the other hand the cultural conditions were ideal and every egg produced a healthy and well nourished infective larva enclosed in a sheath, then the average longevity of the larvæ would be very high and the curve of larval mortality would show a prolonged level culminating in an abrupt fall to the base line.

These considerations lead to an important point. The short average longevity of hookworm larvæ in the tropics as compared with temperate climes has been associated by myself and others with increased activity and consequent exhaustion of larval food reserve. But the effect of temperature in accelerating the action of any harmful agent during the period of development must also play a part.

It will be noted that I have not attempted to throw my figures representing the survival of hookworm larvæ into the form of a curve. This omission is deliberate; to have done so would have given a fictitious appearance of accuracy. The limited time at my disposal for this research did not permit of the adoption of a sufficiently exact technique for complete quantitative accuracy. But the facts warrant the conclusion that the rate of larval mortality was relatively low in the earlier weeks of the pan, and of one of the pot experiments. They, therefore, support the conclusion that I had hit upon good cultural conditions.

It must be remembered that the natural reaction of the soils used was modified, firstly, by acid generation from the fæces, and secondly, by alkali produced from the layer of wood-ash covering the pans.

Both Looss (1911) and Stoll (1923) have produced evidence to show that excess of acid in culture impairs larval production and larval viability. The initial effect is exerted on the eggs in the morula stage. The following paragraph is extracted from Stoll (1923), No. XVII, page 149. "Not only in the changing number of the larvæ secured by isolation, but by their striking differences in appearances, as derived from the charcoal and unmodified fæcal cultures, there were being emphasized the conditions of hookworm well-being in one case and its lack through environmental rigor in the other. To follow the day-to-day 'remarks' (Tables I and II), contrasting the charcoal and the fæcal cultures, gives a hint of this. Every additional day's observation of the forms from the bone-black showed typical stages in excellent condition. Those from the fæcal cultures, on the other hand, not only by their declining numbers, but by the lack of food granules and the presence of dead forms, evidenced the fact that the survivors were worms of a quality wholly different from the charcoal forms."

The unmodified fæcal cultures reached pH 4.8. No larvæ whatever developed in many of Stoll's straight fæcal cultures; in all these fæcal cultures the number of larvæ produced was insignificant compared with the number obtained from the corresponding charcoal cultures.

It is obvious that any impoverished larvæ reaching the infective stage in these acid cultures must have had low powers of continued survival.

In the Calcutta experiments the hookworm larvæ were not developed in the soil itself but separately in charcoal cultures; extracted on the seventh day, and then added to the surface of the soils under experiment.

Dr. Chandler says nothing about the reaction of the charcoal but presumably it was alkaline since Looss points out that acid charcoal is useless for developing hookworm larvæ.

We may reasonably infer, therefore, that mature infective larvæ in good condition were applied to the soil in these experiments.

Moreover, while developing larvæ live in the interstices of the soil, infective larvæ spend most of their time extended in the air upon the surface of the soil particles surrounded by a capillary film of soil liquor.

It is not surprising that so little difference was exhibited in the longevity of the added larvæ in soils whose reaction varied from pH 7.5 to pH 5.2.

The maximum larval longevity of 81 days obtained by Dr. Chandler is a little below what one might reasonably expect after making due allowance for the relatively high atmospheric temperature prevailing during the Calcutta experiments. Add seven days and compare the result, 88 days, with the longest life obtained in the Colombo pan experiments, 124 days. In the Colombo pot experiments infective larvæ were introduced into the surface layers of the soil. The maximum larval longevity was at least 120 days; adding 11 days for cultivation we obtain a total larval life of 131 days. But as I point out on page 24, larvæ must use up a certain amount of energy in the process of extraction. See page 4 of my preceding paper, "Looss is probably correct in considering the tendency of the mature infective larvæ to migrate into water to be an innate character of the organisms. It forms one of the tropic reactions which enable the parasites to reach their definitive host."

It follows that the results of neither my own nor Dr. Chandler's pot experiments really represent the true maximum of longevity of the hookworm larvæ under observation. The results are influenced by the intervention of an artificial procedure, namely, extraction of the infective larvæ from the cultures by Baermann's method.

We should be grateful to Dr. Chandler for providing us with valuable and interesting data regarding the longevity of infective hookworm larvæ on soil during the hot weather in Calcutta, but I fear that he has thrown little light on the general question of the survival of hookworm larvæ in acid soils under natural conditions.

His final conclusion that the acidity likely to be present in ordinary agricultural soils does not interfere with the survival of hookworm larvæ cannot be accepted as a legitimate inference from the results of his experiments, which are only applicable to the resistant stage of the life history of the larva.

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SOIL ACIDITY AND SURVIVAL OF HOOKWORM LARVÆ.

A REPLY TO DR. HIRST'S CRITICAL COMMENTARY.

By ASA C. CHANDLER, Ph.D.,
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I REGRET that I misconstrued Dr. Hirst's meaning when he stated that acid soil is unfavourable to "the continued survival of hookworm larvæ." The fact that he speaks of its effect on development in the following sentence not unnaturally suggested that he made a distinction between survival and development, and that he was not thinking only of an *indirect* effect on survival due to an unfavourably influenced development. I am in full agreement with Dr. Hirst's ideas as amplified in his critical commentary of my paper.

I am sorry that Dr. Hirst misinterpreted my paper to the extent of inferring that I assumed that soil acidity exerts its main influence on the infective stage of the life history of hookworm larvæ and that my whole investigation was based on this erroneous assumption. I gladly agree with Dr. Hirst that such an assumption, had I made it, would have been quite unjustifiable and erroneous. I considered the development and the continued survival of hookworm larvæ as two separate phases of the problem, and purposely confined myself to a consideration of the latter phase, having planned to investigate the former by an entirely separate set of experiments. In order to eliminate the influence of acidity on development and the consequent indirect effect on survival it was *necessary* to use healthy, vigorous larvæ hatched and developed under identical conditions, if the influence of soil acidity on the longevity of infective larvæ was to be studied, and I tried to make it clear in my opening sentence that this was the object of my experiments; it did not occur to me that omission of a discussion of effect on development would be construed as suggesting that there was no such effect. I am grateful to Dr. Hirst for giving me an opportunity to correct such a misunderstanding.

Dr. Hirst suggests that the effect of soil acidity could be studied by merely mixing fæces with soils of different acidity and composition and observing the effect on development and survival of the larvæ. To my mind the problem is not so simple, otherwise the experiments on this phase of the question would have been done long ago. When one mixes fæces with soil a great variety of new factors are introduced, as Dr. Hirst himself hints. The acidity of the fæces, the decom-

position products as they decay, their nutritional value, the reaction of their constituents with the constituents of the soil, the relative proportions of soil and faeces and the nature of the soil-faeces mixture are all factors of the utmost importance, and may very well overbalance any effect which a moderate degree of soil acidity, such as is ordinarily found in agricultural soils, might have. One's object in such an investigation is, of course, to find out what happens ordinarily in nature, and one must simulate natural conditions as closely as possible. In Bengal and Assam the natural course of events, after a stool is deposited on soil, is for the faeces to be very thoroughly intermixed by dung beetles with the underlying soil, which is dug up into a loose granular pile. The proportion of soil to faeces when the process is completed, say in 24 hours, probably does not vary within very wide limits, but even if one ascertains approximately how many grams of soil is mixed with a gram of faeces it is impossible in the laboratory to simulate the beetle mounds in a satisfactory manner by artificially mixing faeces and soil. I have tried it repeatedly without success. Consequently to satisfactorily study the influence of reaction of soil in nature one must place samples of single stools (in order to avoid differences in acidity, composition, etc.) on the different soils to be tested and expose them where they will be naturally mixed by dung beetles, and the experiment should be repeated with faeces of different types. Moreover, as Dr. Hirst has intimated, it is impossible to study soil acidity alone, without consideration of other characteristics of the soil, e.g., humus content, mineral constituents, available food material, etc. For these reasons the study of the effect of soil acidity on the development of hookworm larvæ is a very difficult and complicated thing. The effect on the developed larvæ is a comparatively simple thing, for in nature the influence of the faeces has usually largely disappeared by the time the larvæ have matured, and the soil alone need be considered. It seemed worth while to find out as a preliminary whether the larvæ, once developed, would be influenced by mild acidity, and my experiments showed that such was not the case. That healthy infective larvæ do develop in considerable numbers in acid soils is certain, since I have isolated over 1,200 from half a pint of Assam soil having a pH of 5.5, all of them, so far as could be judged by appearance, very healthy and well supplied with nutritional granules. It is, therefore, interesting to know that such larvæ have just as good chances of survival as if they were on neutral or slightly alkaline soil.

A NOTE ON SOME PREDISPOSING FACTORS IN ASTHMA.

By M. A. KRISHNA IYER, I.M.B.,
Alipuram Jail, Bellary.

Few medical men have successfully treated and cured a real case of asthma. The truth of

this remark is borne out by the very many and very varied lines of treatment in vogue. Injections of peptone solution have stopped the attacks in some cases for two years, whilst in others soamin injections have been successful. Spraying of the mucous membrane of the nasopharynx has succeeded in some cases, whilst regulation of the diet has benefited others. Inhalation of the fumes of nitre paper has given considerable relief to some patients, whilst patent stramonium cigarettes have relieved others. Administration of calcium salts is resorted to by some doctors, whilst others claim that giving potassium iodide greatly lengthens the intervals between attacks. We have to-day no rational, standardised and single mode of treatment for asthma.

Yet an investigation of the causative factors is not unimportant, as the following cases may shew:—

Case 1.—A rich Brahmin landlord whom I was called in to attend in his village. After giving the usual type of injections, and administering a mixture of potassium iodide, belladonna, and lobelia, etc., he recovered within a few days. A few months later he got another attack, whereupon a similar line of treatment did good. On close enquiries, however, I found that his attacks always occurred during the padi harvesting season. It is customary in South India for the padi to be heaped up in different places inside the dwelling houses before it is all finally collected from the fields and then stored in the granary. The patient's attacks always came on during this process, when he had to move about inside the house amidst stored heaps of fresh padi.

Case 2.—A male patient aged about 50 who is an oil monger, and prepares gingelly oil by expression of the oil from seeds in an oil press worked by bullocks. He gets the attacks of asthma regularly during certain seasons of the year when there is a special demand for this oil in connection with certain festivals, and when he is especially busy at this type of work almost exclusively.

Case 3.—A woman who gets her attacks regularly during the "flowering season." Her occupation is to make garlands for the deity in the temple. At certain seasons of the year there are different flowers in season which are used to make the garlands, and it is at such seasons that her attacks of asthma come on.

Case 4.—A woman who cannot tolerate certain articles of diet; for instance buttermilk never agrees with her and invariably precipitates an attack.

From such cases one sees how climatic seasons, food, different occupations or commodities which one is obliged to handle may be the undoubted causes of and the immediate stimulating factors in attacks of asthma. Similar cases have been reported in other medical journals, such as the occurrence of attacks of asthma after using a pillow stuffed with a certain species of down and of their cessation when the pillow was changed. Further, in the issue for March 1925 of the *Indian Medical Gazette*, Majors H. W. Acton and R. N. Chopra, I.M.S., have recorded similar instances. In such instances a careful enquiry into all the circumstances associated with the attacks and the taking of appropriate measures for the avoidance of the stimulus which provoked the attacks may effect a cure.

A Mirror of Hospital Practice.

A CASE OF SNAKE-BITE TREATED WITH ANTIVENOMOUS SERUM.

By L. A. P. ANDERSON, M.A., M.D.,

MAJOR, I.M.S.,

(From the Central Research Institute, Kasauli.)

REPORTS of cases of snake-bite which have been treated with antivenene, and which have recovered, are not uncommon in the medical press, but it is, perhaps, less common to have an opportunity of reporting a case (a) in which the victim had certainly been bitten, (b) in which the biting snake was undoubtedly of a well-known poisonous variety, (c) in which treatment was begun so soon after the bite that the chances of saving life were favourable, even if a lethal dose of venom had been injected, and (d) in which systemic injection of antivenene alone was relied on for treatment.



The patient, a robust Hazara cooly, aged about 35 years, was bitten by a daboia (*Vipera russellii*) on the first phalanx of the left forefinger.

He came straight up to the Central Research Institute—a distance of about $\frac{3}{4}$ of a mile up a steep climb—reaching there about half an hour after receiving the bite. He brought the snake

with him—alive and uninjured—holding it by the back of the neck and the tail. The snake was a moderate sized Russell's viper, $2\frac{1}{2}$ feet long and 4 inches in girth.

When first seen, the man was pale and shocked, sweating profusely and with a full bounding pulse. He had two well-marked fang punctures on the back of the left forefinger. One of the punctures had been converted into a linear cut, the result of dragging off the snake. The finger was considerably swollen, and the wounds were sealed with clotted blood. There was no doubt whatever that the fangs had really penetrated.

He had applied no ligature, but had followed the common Indian practice of tying a piece of rag somewhat firmly round the part above the wound, in this case the left wrist.

He stated that on the way up to the Institute he had vomited twice, and that the vomit contained blood.

As soon as the patient arrived, about half an hour after receiving the bite, he was given 80 c.c. of Kasauli antivenene intravenously into the median basilic vein. The actual wounds were dressed with iodine and bandaged, but no other local treatment was given.

Almost immediately after the injection of antivenene the patient vomited and continued to do so at frequent intervals for about an hour. Diarrhoea then set in and he passed four or five large liquid stools in about fifteen minutes; neither the stools nor the vomit contained blood.

Forty minutes after treatment was begun, and about 70 minutes after receiving the bite, there was marked oedema of the left hand and wrist, and the man complained of severe pain in the hand and arm up to the axilla. He also complained of chilliness, thirst and drowsiness. Eighty-five minutes after the first injection, he was given a second intravenous injection of 80 c.c. of antivenene.

Beyond these two injections of antivenene he received no other treatment except that he was kept warm and given such drinks as hot tea and milk, or water, when he complained of thirst. He remained quite quiet, lying on a "charpoy" in front of a stove, and except for drowsiness, thirst and local pain he exhibited none of the symptoms of daboia poisoning. Throughout the time he remained at the Institute—about five hours—his pulse and respiration remained good; the former never rose above 100 and the latter varied between 19 and 26 per minute.

As soon as it seemed certain that the man's life was no longer in danger, he was transferred to the Cantonment General Hospital for observation and any further treatment which might be necessary.

On admission there, the site of the wound was incised and permanganate crystals were rubbed in. This was about six hours after the bite.

The man remained in hospital for four days. He showed no ill-effects from the bite except

pain in the arm which was very troublesome for 24 hours, and marked cedema of the hand and forearm on the affected side. There was still some cedema of the dorsum of the hand when he was discharged from hospital.

Two days after his discharge a pre-existing boil on the back of the left wrist developed into an abscess, which was incised and treated in the usual way. The boil had no connection with the snake-bite.

On the 8th day after the serum injection he developed a serum rash, chiefly marked over the buttocks and back. He was re-admitted to hospital and detained 3 days, by which time the rash had disappeared.

COMMENTS.

While it is, of course, not possible to be sure that the patient had received a lethal dose of venom, yet the snake causing the bite was of sufficient size to have injected a fatal dose and the condition of the wounds showed clearly that penetration of the fangs was complete and that the snake had got a good grip. The man had walked up a considerable hill, about 500 feet, to reach the Institute, and the resulting acceleration of the circulation, with no tourniquet on the part bitten, must have given the venom every chance of reaching the systemic blood-stream even taking into consideration the well-known variability in the rate of absorption of daboia venom.

No local treatment was given until 6 hours after the bite, and reliance was placed on the rapid administration of the specific antivenene.

The local condition, cedema, etc., showed that a certain amount of venom, at any rate, had been injected.

No general symptoms of daboia poisoning supervened, except drowsiness and thirst. It is probable that the vomiting immediately after the bite was due to shock and fright, and the later emesis and the diarrhoea were probably the result of the serum injection.

Recovery was complete, and except for a small sloughing ulcer at the site of the bite, and slight cedema of the left hand, no signs of his accident remained when the man presented himself to be photographed four days later.

I am indebted to Sub-Assistant Surgeon Sangat Ram, in sub-charge of the Cantonment Hospital, Kasauli, for the man's after history, and to Lieut.-Colonel S. R. Christophers, C.I.E., O.B.E., I.M.S., Director, Central Research Institute, Kasauli, for permission to publish this case.

A CASE OF KALA-AZAR IN THE SIMLA HILLS.

By B. J. BOUCHE, I.M.D.,

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THE following case of kala-azar may be of interest to some of the readers in Northern India as exemplifying a much-too-common obsession of

"chronic malaria" in all fevers which baffle a better diagnosis.

The patient, an Anglo-Indian, girl, 12 years of age, arrived at Jutogh, Simla Hills, from Sanawar, on 1st June, 1925, for the Whitsuntide holidays with a statement from a medical officer, that she was suffering from "anaemia" the result of "chronic malaria," recommending that she be kept at Jutogh with her mother for a month.

Condition on Admission.—Marked anaemia, ill-nourished and emaciated, spleen enlarged 3" towards umbilicus, and temperature 99.4°F. Tongue fairly clean; liver slightly enlarged downwards; haemoglobin 75 per cent.; weight 79½ lbs. Blood negative to malaria.

Previous History.—Fever some 8 years ago, when living in Madras, which was negative to enteric and suspected to be kala-azar. The patient has had fever of low irregular type and was repeatedly treated for malaria with no benefit. She was in hospital at the Sanawar School frequently and about a year ago was in association with a case of kala-azar there. The patient's aunt also suffered with kala-azar and the patient was in contact with her before coming in touch with the case at Sanawar.

6th June, 1925.—No response to quinine (grs. 5 t.d.s.) given from 2nd June, 1925, 9-30 p.m. Temperature 106°F. Intravenous injection of quinine bihydrochloride (grs. 3).

7th June, 1925.—8 A.M. Temperature 98.6°F. Intravenous injection of quinine bihydrochloride (grs. 2½). Urine now distinctly "milky," showed marked chyluria and the microscope revealed a large number of microfilariae. The quinine was now increased to grs. 10 t.d.s. and a mixture of tinct. ferri perchlor. and glycerin was added as an anti-filarial measure.

9th June, 1925.—Slight epistaxis.

10th June, 1925.—Intramuscular quinine bihydrochloride (grs. 3); great difficulty was experienced in entering the veins.

The patient was placed on the "seriously ill" list although clinically her condition was remarkably good with a minimum of disturbance. The appetite was retained throughout the fever and the patient demanded her curry and rice.

The finger blood was examined for the fifth time for malaria without success. Leishman-Donovan bodies were seen in three large mononuclear leucocytes.

11th June, 1925.—Chyluria disappeared but filariae still persisted in the urine. Quinine omitted for one day on account of indigestion.

13th June, 1925.—Napier's formalin test positive.

16th June, 1925.—Urea stibamine intravenously (0.035 grm.)

Quinine was now permanently omitted.

A severe urticarial eruption broke out immediately after the urea stibamine injection, accompanied with nausea and vomiting, but in half an hour's time the patient was quite calm and well. Large doses of sodium bicarb. (1 drachm) were

frequently given by the mouth in milk and water.

18th June, 1925.—Second intravenous injection of urea stibamine (0.075 grm.). This was given in one of the large pre-malleolar (internal) veins of the right foot as the conventional veins in the elbows were both still suffering from the previous trauma.

20th June, 1925.—The foot was acutely inflamed and blistered in parts, for which suitable treatment was applied.

From 22nd June, 1925 to 21st August, 1925, the patient was given doses of 0.45 grm., 0.1 grm. and five doses of 0.2 grm. each—a total of 1.66 grms.

The temperature which had been running up to 104°F. came down to normal after the third injection of urea stibamine and did not rise subsequently.

The weight of the patient is now 85½ lbs., representing an increase of 6 lbs. since she first came under treatment—a period of ten weeks.

1st September, 1925.—The patient has now completed the treatment and is in all respects "fit."

I am indebted to Major A. Gardner-Brown, R.A.M.C., Officer Commanding, British Station Hospital, Jutogh, for his kind permission to publish these notes.

A FOREIGN BODY IN THE PELVIS.

By K. M. NAYAK,

Assistant to District Medical Officer, Vellore.

A FEMALE patient Chellamma by name was admitted on 16th August, 1924, into the Government Pentland Hospital, Vellore, for a swelling on the right side, immediately above and behind the highest point of the crest of the ilium. The swelling was well marked, oval in shape, and about the size of a duck's egg. It was slightly painful, a little tense and fluctuating. Her temperature was 99°F and pulse 74; general condition good. She was fairly well nourished, of good physique and appeared to be in the enjoyment of sound health. No information could be got from her regarding the previous history. So the diagnosis lay provisionally between a suppurating hæmatoma and a tubercular abscess of the spine pointing in the iliac region. She was prepared for operation and under chloroform anaesthesia the swelling was incised. Nearly 2 ounces of curdy matter tinged with blood was evacuated, the cavity was irrigated and just before closing the cavity was explored with the finger. It was occupying the upper part of the right iliac fossa. The cavity was retro-peritoneal and the floor of the cavity was formed by the iliac bone and at the bottom of it a small hard pointed object like a spicule of bone was striking against the tip of the finger, at the same time conveying to the finger the same sensation as is felt when a tuning fork is struck. The projecting end of the same object was caught with a pair of artery forceps and on gently

pulling, out came a piece of coconut broomstick 4 inches long. These broomsticks are generally used here in the Madras Presidency for preparing swabs for painting with tincture iodine. This piece of broomstick was covered with a thin layer of white incrustation along its whole length, thereby giving us an idea that it must have been lying in the tissues in the iliac fossa for some time. Though a tentative diagnosis had been made beforehand of a suppurating hæmatoma, there was absolutely no history of any injury from outside and there was absolutely no evidence to suspect that the broomstick found its way from outside by piercing the skin and lodging itself in the right iliac fossa. Hence, while the patient was still under chloroform, we immediately put her in the lithotomy position, opened out her vagina by a duck bill speculum and, on examining the interior, found out on the right wall of the vagina, a small red ulcerated opening with a small bead of whitish pus at its orifice and which admitted the end of a metal probe, and our suspicion that the broomstick must have been introduced per vaginam was confirmed.

A drainage tube having been inserted into the abscess cavity, the wound was dressed and the patient was taken to the ward. She had an uneventful recovery and was discharged on the eighth day. On coming round from the effects of chloroform the patient, when she was minutely questioned, gave the following interesting story with the greatest reluctance and after the greatest persuasion, that she was aged 16 years and married for the last 2 years. Six months ago her husband had left her destitute and homeless. He having gone to Penang as an emigrant in a labour corps had left her to her wits and to the tender mercies of his relations. Having been thrown astray in this wicked world, homeless and penniless, and surrounded by temptations she had naturally gone astray, and she became pregnant. Being unable to hide her condition any longer, the guilty woman sought the help of the village barber, midwife or *dhai* at the end of the fourth month, and this worthy woman introduced this piece of broomstick to cause abortion. Instead of pushing it into the uterus she pushed it the wrong way outside the cervix, pierced the vaginal wall and sent it right home into the right side of the pelvic wall. I am pretty certain she had used considerable force before she achieved her object. Abortion resulted within 24 hours. The foetus came out, but not the instrument that was used to produce the abortion, which remained embedded in the tissues of the pelvic wall. Beyond causing slight dull aching pain and discomfort while walking, the patient was not in any way inconvenienced by the presence of the broomstick inside her pelvis, till at the end of 2 months (2 months after the abortion) she noticed a slight painful swelling on the right side, immediately above and behind the highest point of the crest of the ilium. This swelling gradually increased in size

and in the course of 10 days attained the size of a duck's egg and made her seek admission into the hospital. It is quite evident that muscular action was responsible for bringing it to the surface, and that the pilgrimage and the journey to its destination had taken 2 months to be accomplished. The *dhai* was responsible for the entry and Nature was responsible for the exit. It is also remarkable to note the friendly attitude of the structures of the pelvic wall, especially those at the brim in giving a free unchallenged passage to the foreigner. It stands to reason that the broomstick passed beneath and behind the big iliac vessels while crossing the brim of the pelvis and at the same time not injuring them. I have no doubt that the broomstick was retro-peritoneal.

A CASE OF HIRUDINIASIS OF THE MALE URETHRA.

By Capt. P. N. MITRA, M.B., D.T.M. (Cal.),
Civil Assistant Surgeon, Assam.

A PATIENT, M. M., aged 8 years, came to hospital at 4 P.M. in October 1925 with the following history.—He was fishing with a rod at about 12 noon in a marsh (*bhil*), standing knee-deep in water without any clothes on, when he suddenly noticed a leech entering his external meatus urinarius. He tried to pull it out but the leech slipped inside and he had been unable to pass any urine and blood dripped from his urethra.

On examination I found blood dripping from the external meatus and his clothing over the corresponding area was soaked with blood. A soft rubber catheter was passed and met with no obstruction; bright red blood diluted with urine was drawn out of the bladder. The bladder was washed out and the washings returned blood-tinged. Some strong salt solution and adrenalin was left in the bladder, the catheter withdrawn and the patient put to bed. No voluntary micturition was possible the next morning. Bloody urine was again withdrawn through the catheter, strong saline and adrenalin being repeated as before. As voluntary micturition was not possible catheterization was repeated in the afternoon and again next morning. During the last a certain amount of dark-brown granular blood was withdrawn. Catheterization was repeated in the afternoon with the same result, and during the night the leech was passed out with violent colicky pains. It measured 4 in. by $\frac{1}{2}$ in.; the mouth and anus were open and dark granular blood could be pressed out of its abdomen.

The points to be noted are:—

- (1) The rarity of the accident.
- (2) The leech bit at one or more points in the anterior urethra and then passed into the bladder where it fed itself.
- (3) It was killed by salt solution.
- (4) After death of the leech the sphincters relaxed, permitting regurgitation of some of its abdominal contents.

- (5) It then became flaccid and engorgement occurred leading to its spontaneous extrusion.
- (6) The boy was circumcised.

AN OUTBREAK OF ANTHRAX CONTRACTED FROM HANDLING INFECTED BEEF.

By A. K. MUKERJI, D.P.H.,
District Health Officer, Tipperah.

AKRAM ALI, a villager of Sripur, Tipperah, slaughtered a cow in order to give a feast. Within three to seven days of the feast Akram Ali, Imam Bux, Rahim Bux, and Medur Ali, who had all taken part in killing the cow and dressing the meat, developed malignant pustules. They were attacked with malignant pustules on the face, forehead or hands, attended with high fever. Imam Bux was the first to be attacked, on the 27th August, 1925, and died on the 30th. His son Rahim Bux, and Akram Ali both died on the 1st September, and Medur Ali two days later.

As a result of this outbreak a state of terror prevailed among the villagers, and I proceeded to Sripur to investigate matters. I found four further cases who were still suffering from malignant pustules, the pustules having broken down and forming the characteristic ulcers, as shown in the illustration on p. 23. The ulcer on the back of the adult female patient had given rise to much sloughing and had exposed the tendons. Films and scrapings from the ulcers showed anthrax bacilli, together with numerous staphylococci and streptococci. On enquiry it was reported to me that all three persons had handled the infected meat before cooking it. Further, the villagers reported that two cows belonging to one of the infected families had died two months previously quite suddenly, having been ill for only six hours, with a sanious discharge from the nostrils, mouth and intestine. The villagers also stated that the cow which had been slaughtered for the feast was diseased. The villagers in Sripur have no trade in hides, but are cultivators, and I was unable to trace any other possible source of infection except those mentioned.

The ulcers were treated with antiseptic dressings and eusol lotion, and precautions taken to prevent the spread of the infection to others. A point which I noticed was that, although these infected persons were freely in contact with others and no precautions had been taken to prevent the spread of the disease before my arrival, there were no further cases. Possibly the anthrax bacilli had become attenuated on passage through man, a less susceptible host than the cow.

Outbreaks such as this often fail to come to the notice of the public health authorities, whilst the villagers are quite ignorant of the risks run by both human beings and cattle from the slaughter of infected animals.



A CASE OF BILATERAL DISLOCATION OF THE LENS.

By Dr. ARTHUR H. DRIVER, M.B., Ch.B. (N.Z.),
*Medical Superintendent, London Mission Hospital,
 Jammalamadugu, Madras Presidency.*

THAIGADU, a village coolie, who came for treatment on account of impaired vision, presented a curious condition on examination.

The lens of the left eye was completely dislocated, moving freely in the anterior chamber with the movement of the eyeball. It showed only a very slight central opacity. The iris was tremulous and its free rim atrophic and coloured a light blue, contrasting with the deep brown of the body of the iris. Vision 2/36.

No lens could be seen in the right eye on first examination. The iris of this eye was tremulous and discoloured as in the other eye, but on getting the patient to lean forward a white cataractous mass floated up from the depths of the vitreous, appearing to fill the anterior chamber. Vision, perception of light only: tension, slightly plus.

Both eyes were operated upon on the same morning. The lens of the right eye was transfixed with a Bowman's needle with the patient sitting, the only position in which the floating lens could be caught. It was then rotated slightly inwards to make room for a clear incision, which was most conveniently done in the lower quadrant. The transfixed lens was then easily manoeuvred on to a spatula and extracted in the capsule. No vitreous loss.

Removal of the left lens was straightforward, the lens escaping immediately after incision.

Reaction was slight only in both eyes; perception of light was retained in the right eye, whilst the vision in the left improved to 3/12 with a + 14 lens.

Only a vague history of pain and redness in the right eye two years before admission could be obtained, with similar symptoms in the left eye for one year before admission. The patient persistently denied having had couching or any other form of treatment. It is difficult to believe that the right lens of this case was not couched and yet is it not possible, though of course rare, for a cataractous lens to become free of its ligaments without interference? Further, the condition of the anteriorly dislocated, non-opaque lens of the left eye certainly did not suggest couching.

The following pathological notes on the lenses were supplied to me through the courtesy of Major R. E. Wright, B.A., M.D., I.M.S., Superintendent, Government Ophthalmic Hospital, Madras:—

"Both the lenses are markedly smaller than normal. The clear lens is 6.5 mm. in diameter, almost globular. The opaque lens is of approximately the same diameter as the clear one, but more flattened antero-posteriorly. It is very hard and densely opaque throughout, the nuclear portion being more opaque and friable than the cortex. The capsule shews irregular thickenings and strips readily from the lens."

EXPULSIVE HÆMORRHAGE IN CATARACT OPERATIONS IN RURAL PRACTICE.

By K. B. ISRAIN, L.C.P. & S., L.M.P.,
Daharki, Sind.

ONE of the chief complications in the intra-capsular operation for cataract in rural practice in India is expulsive hæmorrhage. Village patients allow one no opportunity to prepare them for operation beforehand, and the result is sometimes expulsive hæmorrhage,—partly due to a glaucomatous tendency, partly to a nervous tendency on the part of the patient. The following two cases may be cited:—

Case 1.—An adult female patient operated upon on the 24th March, 1925. After cocainising three times with a 10 per cent. solution, I began the operation. As soon as the corneal incision in the right eye was finished the lens came out, accompanied by vitreous and followed by profuse bleeding. I at once instilled 1 in 1000 solution of adrenalin chloride and made my assistant press on the eye with a cotton-wool swab soaked in perchloride lotion. In the meantime I carried out the operation on the left eye with satisfactory results.

I then changed the swab on the right eye and bandaged the patient, but the bleeding did not stop. The patient was put to bed and $\frac{1}{2}$ grain of morphia given hypodermically, and a dose of calcium chloride by the mouth. The latter dose she immediately vomited. Half an hour later the dose of calcium chloride was repeated, but was again vomited.

That night the patient had no sleep, whilst the bleeding continued. I next administered 20 m. of adrenalin chloride solution hypodermically and gave calcium lactate, grs. 15 in solution orally, the dose being repeated every half hour. The bleeding now stopped. Next day the dressings were changed. On the eighth day the left eye was found to be doing well, but the right eye was shewing a tendency to protrusion. This eye was treated with instillations of silver nitrate, grs. 10 to the ounce, and the patient was discharged at a later date.

Case 2.—A male patient, aged about 60 years, presented himself for double cataract operation. The operation was carried out successfully by the usual intra-capsular method and the patient carried to his cot. Half an hour later he complained of a reeling sensation in his head and of burning pain in the right eye. The bandage was found to be soaked with blood. A subcutaneous injection of 20 minims of adrenalin chloride solution was at once given and the patient given eight doses, at half hourly intervals, of calcium lactate mixture. Next day the dressings were changed, when there was found to be bleeding from the left eye. On the fifth day the left eye was again examined, after having been left alone during the interval, and was found to be doing well. On the fifteenth day the patient was discharged.

Points of interest about the two cases are:—

(1) The hypodermic injection of adrenalin chloride solution appeared to be more efficacious than injections of morphia in controlling the hæmorrhage.

(2) Calcium lactate appeared to be better tolerated in aqueous solution orally than was calcium chloride when the patient was predisposed to vomiting.

(3) The left eye in both cases was normal or almost normal despite the hæmorrhage in the right eye.

(4) The failure of half a grain of morphia

in the first patient's case to secure sleep or even restfulness.

A CASE OF SEVERE ABDOMINAL INJURY.

By ROMENDRA K. BASU,
Assistant Surgeon, Damka, Balasore.

THE publication on p. 269 of the issue of the *Indian Medical Gazette* for last June of Dr. Row's case of abdominal injury prompts me to record one of still more serious abdominal injury.

The patient, J. M., a Hindu male, aged about 24, was brought to the Balasore Hospital about 8 A.M. on 28th October, 1924, with a history that he had been gored by a buffalo the previous evening. Some 5 feet of intestine had protruded through the rent in the abdominal wall and had been at once wrapped up in the filthiest of rags. In this condition he had been carried to hospital a distance of some 12 hours' transit in a *dooly*.

On admission his condition was very bad, and before operation $1\frac{1}{2}$ pints of normal saline with pituitrin was injected subcutaneously into the right axilla. On examination under chloroform anæsthesia it was found that the eviscerated gut was perforated in 3 places, each rupture being about 1 inch by $\frac{1}{2}$ inch in size, and the three perforations being close together. The exuded serum bathing the torn gut was mixed with solid faecal matter.

The torn gut was cleansed with hot saline, but no general irrigation of the peritoneal cavity was resorted to. On attempting to suture the torn gut with Lembert sutures the ragged margins of the rents gave way; finally the tears were repaired by using both Lembert and purse-string sutures. In order to replace the intestine within the abdominal cavity the original wound had to be enlarged. The sites of the tears in the gut were touched with pure "Electrolytic chlorine" before replacement, the wound three-quarters closed, and drainage resorted to.

Two injections, each of gr. 1/100th of atropine, and an injection of pituitrin and one of hyoscine were given the same day. The patient's condition was critical for two days. The day after operation the wound was opened up. It was found to be whitish in colour from the action of the "E. C.", and some stitches which had torn out were removed. The wound itself was now treated with pure "E. C." and "E. C." dressings were applied daily; 48 hours after operation the patient passed a stool and a rectal tube was inserted to relieve flatus.

On the third day after operation general peritonitis seemed threatening, with persistent hic-cough. Atropine and strychnine were given hypodermically and nothing by the mouth except sips of warm water. After two weeks of dressing with "E. C." lotion the patient was out of danger, and was discharged cured, although it was a month after operation before he could

walk unaided. Dr. S. C. Mitter, the Civil Surgeon, took considerable personal interest in the case.

The patient's recovery after so severe an injury is remarkable, whilst the use of electrolytic chlorine appears to have been of undoubted benefit.

A CASE OF STRANGULATED HERNIA.

By HUKAM CHAND GUPTA, B.Sc., M.B., B.S.,
Assistant Surgeon, Civil Hospital, Mardan,
N. W. F. Provinces.

MIRO, Mahomedan male, aged 28, was admitted to this hospital on the 19th February, 1925, with the following symptoms:—Hiccough of 24 hours' duration; vomiting of fluids—yellowish green in colour, but not of faecal odour; great restlessness; and acute pain in the right inguinal and scrotal region.

Examination shewed a hernia about 4 inches long by $2\frac{1}{2}$ in. diameter. He had been the subject of congenital hernia since birth, and for the previous six days the swelling, previously easily reducible, had been irreducible. He had a pinched look with sunken eyes and clammy skin; temperature 99° , pulse 110, of low tension and with an occasional missed beat; abdomen tympanitic all over but fairly soft; complete constipation for six days; constant retching and vomiting of all fluids taken by the mouth. The scrotal swelling was hard, tense, painful on pressure, dull on percussion. The skin over it was discoloured and reddish brown in colour.

Immediate operation was resorted to under chloroform-ether anaesthesia. On opening the hernial sac fragile material resembling blood clot was discovered. On irrigating this with hot saline it was discovered to be a piece of the great omentum which had undergone dry gangrene. On relieving the constriction at the internal abdominal ring a piece of small intestine, about an inch in length and of normal colour, was found in the sac.

The gangrenous portion of the great omentum was transfixed, ligated and removed. The portion of small intestine was returned to the abdomen; the operation completed by closure of the hernial aperture; and the parts stitched up, as there was no marked effusion during the operation. The patient made an uneventful recovery.

Points of interest in the case are:—(1) The rapid recovery after operation, despite the critical state of the patient on admission, owing to the fact that the intestine was not affected. (2) Hiccough stopped the same evening, after half a c.c. of pituitrin had been given hypodermically an hour after the operation. (3) A tentative movement of the bowels the morning after operation, followed by a full evacuation the next morning after a dose of castor oil. (4) The absence of distension of the abdomen following upon non-affection of the gut, the strangulation being confined to the great omentum.

THE VAGARIES OF MALARIA. THE HEPATIC TYPE.

A Note by—Dr. A. BAYLEY-DE CASTRO,
Junior Medical Officer, Haddo, Port Blair.

FROM time to time one has read articles in the *Indian Medical Gazette* on rare manifestations of malaria, and in text-books one reads of algid and pernicious forms, but I do not think that the "true hepatic form" of the disease has been recorded, and therefore I take the liberty of publishing this note. Last year I had three such cases in my hospital, and this year so far one has been admitted.

Patient No. 45971, a Moplah, reported sick on the 9th May, 1925, complaining of fever and diarrhoea. Both the liver and spleen were slightly palpable and tender. The tongue was clean and the pulse strong in force and normal in frequency. The temperature was normal, and blood films at this date failed to shew malarial parasites, but shewed distorted red corpuscles. The stools failed to shew *Entamoeba histolytica* or ankylostome infection, but contained a little slime.

The next evening he complained of very acute pain in the right hypochondrium and on the morning of the 11th there was rigidity of the upper abdominal muscles and marked tenderness over the liver, together with slight distension of the abdomen as observed in the flanks. The board-like hardness of the abdominal wall prevented palpation, but light percussion shewed an increased dullness upwards to the right nipple and downwards to four finger-breadths below the costal margin. The temperature was normal, the pulse strong and 74 per minute. Blood films now shewed abundant malignant tertian malarial crescents and the total leucocyte count was 13,000 per c.mm.

Owing to this high figure half grain injections of emetine daily were resorted to and intravenous injections of 10 grains of quinine bi-hydrochloride daily, together with a mixture containing quinine and arsenic by the mouth. On the 13th, the enlargement of both the spleen and liver was considerably reduced.

14th May. Total leucocyte count 9,280 per c.mm. Tongue coated with white fur. A localised and very tender spot below the right costal margin. Liver dullness reduced by some half an inch both below and above. Some tendency to constipation, for which a calomel purge was given.

16th May. Liver dullness reduced to the level of the 8th rib above and of the costal margin below. Slight icteric tinge in the conjunctivae and a trace of bile in the urine. Blood films still shewed malarial crescents present. In spite of the severity of the hepatic condition, the patient had not suffered much constitutionally.

The enlarged and acutely congested liver remained as such until the 16th, and there was a certain amount of general constitutional disturbance and pyrexia to 101°F . The patient, however, did not look seriously ill; a liver affected to the same extent by any other infection would undoubtedly have brought about a grave, prolonged and striking constitutional disturbance.

20th May. Crescents still present in blood films. Temperature normal, tongue clean, appetite good, bowels regular, general condition excellent.

25th May. Crescents not found in films. Liver normal. Spleen enlarged to half an inch below the costal margin, hard to the touch.

31st May. Discharged to the post-malarial gang for one month. Feels and looks fit.

In all, the patient had three intravenous injections, each of 10 grains of quinine, and six injections, each of half a grain of emetine. He was on the quinine and arsenic mixture orally up to the date of discharge from hospital.

Points of interest in the case are:—

(1) The acute and rapid enlargement of the liver.

(2) The predominance of hepatic symptoms.

(3) The rigidity of the upper abdominal segment, and especially of the right rectus muscle.

(4) The high total leucocyte count.

A differential leucocyte count, carried out on the 14th May, gave the following figures:—eosinophiles 2 per cent.; polymorphonuclears 65 per cent.; lymphocytes 18 per cent.; large mononuclears 18 per cent.

(5) The absence of marked constitutional disturbance in proportion to the severity of the symptoms; the patient's weight on admission was 109 lbs.; on discharge 107 lbs.

In conclusion, I may mention another case of malignant tertian malaria; patient No. 45690, a man of burly physique, 34 years of age. He was in hospital from the 19th July, 1924, to the 13th August, 1924, with a normal temperature throughout. Blood films shewed numerous malarial crescents; but his only complaint, during the first four days of illness, was of excruciating pains in the head which had driven him to hospital. Big man though he was, he used to cry like a child. He had no other symptom.

THE GASTRO-INTESTINAL TYPE OF MALARIA.

By MADAN H. JHAVERI, M.B., B.S. (Bom.),

*Medical Officer, Loimwe, Kengtung Sub-division,
Southern Shan States, Burma.*

DURING the first six months of 1925, I had five cases of malaria with marked gastro-intestinal symptoms. The patients were all admitted complaining of severe abdominal pain, vomiting, constipation, a very tender abdomen, a pulse full and bounding, with a high temperature, and later collapse. In short the symptoms suggested more or less typical acute peritonitis. In two of the cases there was diarrhoea.

All five patients were military police sepoy with a previous history of malaria. On admission an injection of 10 grains of quinine was given intramuscularly, and within two hours the symptoms were relieved. Next day a further injection of 10 grains of quinine was given, and thereafter the symptoms disappeared and the temperature remained normal.

I cannot say with what frequency such gastro-intestinal cases occur; but I had two similar cases when at Bassein.

In this connection it may not be out of place to comment upon intramuscular quinine injections. Since taking over charge in this district I have given over 500 such injections, and in no single case has any untoward result occurred. In some cases female patients will not permit an injection elsewhere than in the arm, and in some

such cases with very high fever I have given injections in this site with no harmful results.

A CASE OF SENSITIVENESS TO MEAT.

By Capt. P. N. MITRA, M.B., D.T.M. (Bengal),

Pasighat, Assam.

S. C. B., Hindu male, aged 38, consulted me on account of his inability to digest meat. He had suffered from this inability since childhood. If he took even a minute quantity of the cooked flesh of goat, sheep or deer, this was shortly followed by an attack of sneezing, difficulty in breathing, tympanites, and finally urticaria. In consequence he shunned meat, and if absolutely obliged to take it took it in very small quantities, ejecting it afterwards by induced vomiting or by taking a large dose of Eno's "Fruit Salt." Riding on a horse or travelling by bullock cart did not produce the symptoms, whilst he could take the flesh of birds and turtle's eggs without ill effect.

On one occasion he took a patent peptone wine,—the peptone of which apparently came from mutton—and the dose was immediately followed by the same train of symptoms. Judging that he was clearly sensitive to some product of peptic digestion of mammalian meat, I proceeded to desensitise him by injections of peptone,—usually prepared from beef. A dose of 0.3 c.c. of a 7.5 per cent. solution was given at first, the dose being gradually raised to 1.5 c.c. of the same solution. Apparently the treatment was a complete success, but will the immunity be permanent?

TWO CASES OF SYNOVITIS TREATED BY INTRAVENOUS IODINE.

By KHAGENDRA NATH CHATTERJEE, M.B.,

Chinsura, Bengal.

SOME time ago, I treated two female patients who were suffering from some obscure form of synovitis, involving many of the joints of the body either simultaneously or one after another, by intravenous injections of iodine. The ætiology of both was obscure, but in one case there was a history of puerperal fever, and both patients had chronic indigestion and aphthous stomatitis. The joints attacked were tender and swollen, the attacks were usually febrile, and the smaller joints were picked out rather than the larger ones.

Assuming that these attacks were the result of septic absorption, I gave intravenous injections of B. P. tincture of iodine, m. 5 to m. 10, diluted with 2 to 3 c.c. of distilled water. After three to four injections the conditions in both cases appeared to be cured. One of these patients has subsequently been under observation for a period of eighteen months, the other for several months after completion of treatment, and both are at present free from a complaint which at one time made their lives miserable.

Indian Medical Gazette.

JANUARY.

MEDICAL EDUCATION IN INDIA.

THE thoughtful and suggestive book by Abraham Flexner of the Rockefeller Foundation shows that systems of medical education are being subjected to a critical study. This was reviewed in the *Indian Medical Gazette* of October 1925. The author writes with special authority as he has made a detailed study of the methods which are employed in the chief countries of Europe and America. It might be expected that a course of education which has been planned by the General Medical Council of Great Britain would be ideal, but it must be remembered that it is impossible for any body of men to work out a scheme of medical education which is divorced from the traditions of the past. Hence it is that our present system represents a modification of the older schemes which grew up from small beginnings in much the same way as a town grows up, and just as the town planner is hampered by the products of the older builders so those who devise modern methods of medical education find it difficult to make a complete break with the past.

It must also be remembered that the regulations of the General Medical Council are not rigid and inelastic decrees so much as a statement of standards which have to be worked up to by those who desire to obtain recognition for their degrees. These standards have been devised with special reference to the conditions which prevail in the United Kingdom, but in spite of the fact that they may not be suitable in all respects to other countries, they have been accepted by Australia, South Africa, Canada, India and other countries. There is obviously a general belief that the advantages which result from uniformity of standards more than compensate the drawbacks following on the adoption of a curriculum which was not devised for the special needs of these distant countries. Even in India, where the conditions of medical practice are so different from those which exist in England, there has never been a general demand for autonomy in the sphere of higher medical education. On the contrary, there has been an insistent demand for the raising of the standards of education in the medical schools so as to bring them into conformity with the requirements of the General Medical Council. It is true that one Indian University has severed its connection with the General Medical Council because of its refusal to permit the representative of the Council to be present at its examinations. There is reason to

believe that this University desires to regain the recognition of its degrees in spite of the freedom which would result from a permanent divorce from the control of a foreign corporation.

The aims of medical education in general can best be stated in the form of replies to the questions which were suggested by Mr. George E. Vincent of the Rockefeller Foundation. These are—

(1) "What kind or kinds of doctors ought the medical schools to turn out in response to the needs and demands of the public?"

(2) "How best can the doctors be helped to master this knowledge and skill?"

(3) "How can they be given the right attitude towards their work?"

It is only by fixing our attention on these questions and by devising a system of medical education which will conform to the spirit that we can hope to solve the problems of medical education in each country.

Systems of education will not work miracles; some of the finest medical men in the world have received the most indifferent education at their schools, while some of the worst doctors have gone through excellent courses of instruction. In the long run it is the men who count rather than the systems: there are many self-made men in the medical world just as there are in business circles.

At the same time it is clear that the efficiency of the average medical man will depend to a large extent on the quality of the training which he has received.

By good training we do not imply a perfect system of coaching and spoon feeding. The most important quality of the medical man is initiative and this is by no means fostered by perfect tuition. A most important part of the training of the doctor consists in forcing him to dig for himself in the fields of knowledge rather than in presenting to him the results of the labours of others. Instruction and guidance are constantly needed, but when the teacher has provided the student with facilities for obtaining his own knowledge he has done all that is desirable, or necessary. The Indian student in particular suffers from an early training which makes him too dependent on the acquisition of knowledge which is dished up for him in an easily assimilated form, he resents being forced to stretch out his hands and seize what he needs.

It is important that the requirements of the general practitioner should be kept in the forefront: medical education is given, for the most part, by specialists, and it is not easy for them to remember that their point of view must necessarily be quite different from that of the average doctor. The student who aims at specializing in some branch should not be allowed to do so until he has laid a broad foundation of knowledge, and undergraduate instruction should consist of teaching what the general practitioner

ought to know of each special branch rather than of educating budding specialists. If a medical curriculum were to be made up by allowing each teacher to devise a course of instruction in his own subject, the result would be a complete and thorough course of training in all the branches of medical knowledge, and Heaven help the unfortunate student who is compelled to go through such a course.

The medical curriculum is now so extensive that the average student cannot possibly satisfy all the requirements of his numerous instructors, new subjects are constantly being added, the older subjects are becoming more and more complex and human capacity is strained to the breaking point.

But while the curriculum badly needs pruning and revision, its defects are by no means insuperable: the good teacher is never a slave to printed regulations and can easily drive a coach and four through the most rigid restrictions. In this respect the examiner must co-operate, for the best efforts of the teacher can be ruined by a bad examiner.

When questions are asked on rare diseases and on matters which are non-essential, the teachers and students are compelled to divert their energies from the things that really matter and the result is that our young graduates too often have a confused smattering of their subjects, instead of having a good grounding in the work of their profession. Examiners have been known to set questions on rare skin and nerve diseases such as the candidate may never see in after life; it is difficult to explain the mentality which prompts such questions, but the results are to make the examinations a hindrance rather than a help in medical education. It is important that examiners should not be hampered in their work by outside interference, but their autocratic position can only be justified by a record of conscientious work on their part. Taking a good broad survey of the whole question, it is obvious that the teachers and examiners count for more in medical education than the details of the curriculum, and even apart from any alteration in the existing regulations, the training of the doctors of the future could be greatly improved if the teachers and examiners were to keep constantly before them the questions which are asked by Mr. Vincent.

Much attention is being paid to the provision of more doctors for medical relief in the villages of India and many suggestions have been made for the solution of this very important problem: under existing conditions the qualified medical man in India cannot obtain a livelihood except in the larger centres of population. It is proposed by some that great numbers of doctors should be turned out, even though the process should result in a lowering of existing standards. By flooding the medical market men will be compelled to settle down in the villages and so their services will be at the disposal of all. This

simple solution has grave defects: it is quite certain that no doctor can obtain a livelihood in the village: the people refuse to pay for his services and so he is compelled to join the great army of medical men who are struggling for existence in the large towns where there is some faint hope of final success and where his children can go to a good school. The only result of the flooding of the market will be to set up a cut-throat competition and to lower the wage-earning capacity of the medical man. Under such conditions the profession will lose its attractions for the young student and the standards of efficiency will inevitably be lowered.

In a recent editorial the proposal to give a smattering of scientific education to practitioners of the old Indian systems was discussed, and this was shown to be fraught with grave danger to the community and to the future of scientific medicine. The chief danger of this proposal lies in the fact that the practitioners of the old systems would advertise themselves as having learned all that scientific medicine has to teach, in addition to the wonderful secrets of their own systems, so that they would claim to be doubly qualified. In time their pretensions would doubtless be exposed, but in the meantime they would reap the harvest that is always at the disposal of those who make the loudest and most insistent claims. If the Government and people of India seriously desire to have an effective system of medical relief there is only one means by which it can be secured, that is by paying for it, by giving an efficient course of medical training to the large number of intelligent young men who clamour for admission to the medical colleges and schools and then subsidizing them so long as they practice in the selected villages, or by opening fresh dispensaries in the places which are not already provided. The idea of obtaining something for nothing is very attractive to individuals and to Governments, but it seldom works out satisfactorily in practice. It is surprising that the medical profession in India has had so little to say about the various schemes which have been proposed with a view to securing their services for nothing: their interests are at stake and it is essential that they should express their views. They may do so with all the greater force as this is a case in which the interests of the community are the same as those of the doctors. India needs good doctors, and these like most other good articles are the cheapest in the long run. India is far too poor to afford badly trained medical men and it is to be hoped that she will not be guilty of the extravagance which is involved in the education of inefficient doctors and public health workers.

A NOTE TO READERS.

The index to Vol. LX, 1925, of the *Indian Medical Gazette* will be published with our issue for February, 1926. It is hoped to publish the review of the Indian medical year, 1925 as a supplement to our issue for March, 1926.

Current Topics.

CORRECTION.

In connection with Colonel Cornwall's letter (published in the December 1925, issue of this Journal) on the subject of the Ayurvedic treatment of rabies, an unfortunate error has occurred and has been overlooked in proof-reading. In line 2 on p. 599, in place of 63 per cent. please read 6.3 per cent.—as the approximate risk run by people in South India of dying from hydrophobia after having been bitten by a supposedly rabid dog.—EDITOR, I.M.G.

The Radium Institute, Ranchi. A Report on the work from 1st April 1925 to 31st December 1924.

By J. C. S. VAUGHAN, M.C.,

LIEUT.-COLONEL, I.M.S., (retd.), 1925.

Patna: Superintendent, Govt. Printing, Bihar and Orissa.

We are glad to welcome this, the first of the series of reports from the new Radium Institute at Ranchi. We presume that this report is by Colonel Vaughan, although, owing to his characteristic modesty, or to an oversight on the part of the official press, his name nowhere appears in it. No price is stated on the cover of the report, but it is issued under official aegis, and we trust that copies will be asked for by all civil surgeons interested in radium work, for it is full of information and instructions as to sending up patients, etc. The work of the Ranchi Institute is too little known in India; it deserves to become known to the whole country.

Colonel Vaughan first started working with radium in 1913, a very small supply having been procured for a special case. Later on, as success with this was maintained, Sir Edward Gait, then Lieutenant-Governor of the province, aided the work with a special grant in 1917. In 1920 a scheme was put up for the establishment of this Institute, which led to its opening in 1922.

The Institute provides three furnished quarters for Indians, each containing three living rooms; also six similar unfurnished quarters for Indians, of which three are reserved for poor patients unable to pay fees. There are also quarters for European patients. Patients can also be treated at the Institute, though not in residence there. The fees charged are:—(a) furnished Indian quarters, Rs. 2 per day; (b) furnished European quarters, Rs. 4 per day; (c) unfurnished Indian quarters, Re. 1 per day; which fees do not include the cost of diet or of servants; for the application of radium Rs. 20 per application, except for patients in the free quarters; for visits to paying patients in the quarters, Rs. 5 per visit; for visits to those outside, the usual professional fees. Officers sending patients to the Institute should be careful to note several points; first, the accommodation is very limited, and no patient should be sent without arrangements having been made beforehand; secondly, full notes as to the history of the patient and the treatment given must accompany the application, as in the absence of such information, it cannot even be stated whether the case is one suitable for admission or not; thirdly, there is no hospital accommodation at the Institute in the usually accepted sense of the term; and previous arrangements must be made for the patient's residence and dieting; servants, friends, etc. In brief the medical officer, before sending up any patient for treatment, would be well advised to write fully to the Superintendent in charge.

At present treatment is entirely by irradiation from radium salts in sealed containers which cannot be sent out of Ranchi, and radium emanation treatment is not available. The tubes used contain radium sulphate in varying quantities, with one special eyelid applicator containing the equivalent of 7 mgms. of radium bromide.

On pp. 4 to 7 of the report, Colonel Vaughan deals with the general principles of radium therapy, a section

which should be read by every medical man sending up patients. Very important is the fact that radium therapy is absolutely contra-indicated in vaginal and uterine cases with recent or present or chronic inflammation of the adnexa; also the value of irradiation as a prophylactic before and after surgical removal of carcinoma.

In all 534 patients were treated at the Institute during the period under review, and the lessons learnt and experience acquired are already of great value, with special reference to Indian conditions. In general it may be said that radium provides the treatment of first choice in such conditions as leucoplakia, keloids, vascular naevi, rodent ulcer, and epitheliomata of all kinds, especially when in the premetastatic stage, or where situated where surgical operation involves obvious scarring and much inconvenient loss of tissue. It now holds an undisputed place in inoperable cancer, wherever situated, alleviating suffering, adding perhaps years to the patient's life, and in some cases "banishing all evidence of the disease for as long as our experience with radium has extended."

The indications for radium treatment may be generally summarised as follows:—

(1) Cases in which cure in non-malignant conditions, or in conditions clinically free from malignancy, may be looked for or even reasonably anticipated. These include eczema of various types, keloids, papillomata, keratomata, corns, rodent ulcer, lymphosarcoma, non-malignant hæmorrhages from the uterus, and small fibroids.

(2) Cases in which great benefit may be expected, both local and symptomatic. These include psoriasis, xanthelasma, capillary naevi, lupus vulgaris and lupus erythematosus, tubercular adenitis, vicious cicatrices, Dupuytren's contracture in its early stages, exophthalmic and parenchymatous goitre, leucocythemia, lymphadenoma, mediastinal tumours; epitheliomata of the skin, cornea, vagina, and urethra; carcinomata of the breast, uterus, bladder, prostate and thyroid; sarcomata, excluding endosteal cases; endotheliomata; early cases of arthritis deformans; and larger uterine fibroids.

(3) Cases where the result is doubtful; such as pruritus, neuralgia, neuritis; epitheliomata of the tongue, mouth, fauces, larynx and œsophagus; carcinomata of the stomach, intestine and rectum; myelomata; melanomata, and glycosuria.

(4) Cases where the treatment is practically certain to be useless; such as the later stages of Dupuytren's contracture, kraurosis vulvæ, adenomatous goitre, osteitis deformans, acromegaly, lipomata, enchondromata, endosteal sarcoma, syphilis, sclerotic diseases of the spinal cord and paralysis agitans.

The bulk of the work hitherto has naturally been on cases of malignant disease, and especially of carcinoma of the uterus and vagina. Here, Colonel Vaughan quotes from Louis Frank as follows:—

(1) Cancer of the uterine body; treatment by total ablation of the tubes, ovaries and uterus yields curative results which we cannot hope to surpass by any other form of treatment.

(2) Early carcinoma of the cervix; the radical operation constitutes a justifiable procedure, but equally good or better results can be obtained with radium, especially considering the mortality of the operation.

(3) All border-line cases should be treated with radium.

(4) Late cases may be improved and palliated by radium as by no other means within our command.

(5) If the five-year period of curability be accepted as indicating a "cure," then the results of radium treatment surpass by far those obtained by the profession at large in the treatment of cancer of the cervix uteri by surgical means.

Practitioners sending up for treatment cases of uterine hæmorrhage should submit the patient in competent hands to a thorough curetting and the curettings should be examined and reported on by a fully competent pathological laboratory beforehand. No case of

fibroid of the uterus should be sent for treatment in which there is evidence of pelvic or adnexal inflammatory trouble.

As might be expected, so far the Institute has been seriously hampered by the admission of late and hopeless cases. The Indian patient tends to try medicine last and surgery later,—if the phrase may be permitted.

The new Institute at Ranchi is doing excellent work, and Colonel Vaughan is to be congratulated on his first report. We may perhaps be permitted to advise that this report, either as a reprint, or re-edited as a brochure, should be made available for wide distribution; on the lines of the well known brochures of the different Pasteur institutes in India, with full and detailed instructions to medical practitioners and patients. "Our existence is only known at present to a comparatively few," writes Colonel Vaughan, "and experience of what can be done and is being done with radium is personally known to only a comparatively small section of the profession in India." We would especially draw the attention of our readers to the facilities provided at the new institute, the first—but not, we hope, the last—of its kind in India. Its record up to date has been one of unostentatious, but none the less valuable work.

Serological Observations on Relapsing Fever in Madras.

A VERY striking paper on this subject was read before the Royal Society of Tropical Medicine and Hygiene on the 21st May, 1925, by Lieutenant-Colonel J. Cunningham, I.M.S., Director of the King Institute, Guindy, Madras, and is reported in the *Transactions of the Society*, Vol. XIX, No. 1.

What is the mechanism of relapses in relapsing fevers? Two views in general have been held; the exact periodicity of the attacks and the observation of granule shedding by the spirochaetes have led some observers to believe that the spirochaetes undergo a life-cycle in the body; on the other hand the presence of antibodies in the serum of infected individuals has led to a belief that the cyclical disappearance of the spirochaetes from the peripheral blood is due to accumulation of such antibodies, and their re-appearance to the diminution of antibodies. In general the Indian strain of relapsing fever shews only one relapse, as observed in 57 per cent. of experimentally infected animals. Only one monkey out of 168 and one squirrel out of some 700 had shewn a second relapse.

The author had worked with three human strains, one from Tanjore, one from Bombay and one from Madras city. The strains were kept alive by repeated passage through animals, at first monkeys, later ordinary Madras squirrels, which had been found to be perfect experimental animals for the purpose. The agglutination reactions of the spirochaetes were carefully tested throughout the infections. His conclusions were as follows:—

1. In experimental infections in animals, the spirochaetes present during the first attack were found to be entirely different and distinct from those present during the first relapse. Serologically two quite different types occurred.

2. The difference between the two types of spirochaete is quite definite. No trace of any group reaction, such as is found in other well-known groups of organisms, could be detected.

3. This serological change of type is unaccompanied by any obvious alteration in the morphology of the spirochaetes. Minor morphological distinctions have still to be investigated.

4. As far as the Indian type of the disease is concerned, i.e., a disease commonly limited to a first attack and one relapse, only two serological types of spirochaete have so far been implicated. On sub-passage these two types alternate regularly. The serological mutation is freely reversible and prevents a multiplicity of types from occurring in nature. Material for the investigation of the mechanism of second relapses was almost entirely wanting.

5. These serological types are permanent and remain

constant on sub-passage as long as the sub-passage is made during the first attack. Once a relapse has supervened, the type changes.

6. Experiments with other strains of *Spirochaeta carteri* and with human sera indicate that this process holds good in natural infections also.

Thus whilst morphologically the spirochaete of Indian relapsing fever is constant in type, serologically the spirochaete present in the febrile relapse is entirely different from that present in the first attack of fever. In general the type of spirochaete present in the first attack of fever is of the "A" or first attack type; exceptionally however it may be of "B" or first relapse type, so that apparently initial infections with the relapse type of spirochaete may occur in nature.

What is the explanation of this extraordinary mutation of type of the infective spirochaete in a disease which is undoubtedly a single entity? Are two types of spirochaete injected into man by the louse, one causing the first febrile attack, the other lagging in development and causing the first relapse? The regular alternation of strains on sub-passage seems to negative this view. Or is the disease due to a single strain spirochaete which has the power of undergoing complete serological mutation under the influence of antibody formation?

Colonel Cunningham's paper was illustrated by beautiful photo-micrographs of the agglutination reactions, and it is one which will give serologists and bacteriologists furiously to think. The serological reactions of any particular micro-organism have been regarded as the most constant and distinctive of its characteristics. For example cholera-like vibrios are constantly found in close association with cholera epidemics; and it is customary to differentiate them from the true cholera vibrio by their serological reactions. Yet Greig has shewn that the proportion of such cholera-like vibrios found increases towards the decline of a cholera epidemic. Can such vibrios be mutation strains of the true cholera vibrio?

Dr. Ledingham, in commenting on the paper, pointed out that at present the data available with regard to mutation on the part of bacteria are too scanty to permit of drawing any definite conclusions. "I do not think the time has yet arrived when we can explain with satisfaction the interactions between parasite and host, but there is no doubt that mutation of bacteria, as now studied in the laboratory, is going to throw a flood of light on the immunological responses observed in the infected patient." There are laboratory parallels to Colonel Cunningham's spirochaete findings in the H and O variants and the S and R variants in the *Salmonella*, dysentery and other groups of bacteria. The presence in the same epidemic of different strains of meningococci and pneumococci may be instances of related phenomena. Dr. Wenyon suggested that possibly the spirochaetes which initiated the disease might be held to divide at first into two types,—types A and B. Type A might cause the first febrile attack, and then disappear as antibodies against type A accumulated; whereas such antibodies might not affect type B, which would multiply and produce the first febrile relapse, whereupon antibodies to type B would appear. Dr. Manson-Bahr drew attention to the extraordinary variation in the virulence of relapsing fevers in different countries. Associated with this was the fact that the disease was tick-borne in some countries and louse-borne in others. Could one and the same organism become modified in its virulence by being transmitted by different arthropod hosts?

Colonel Cunningham's preliminary paper raises so many and such important matters of interest that we look forward to its promised amplification and continuation in the *Indian Journal of Medical Research*.

The Cinchona Alkaloids in Malaria.

AN exceedingly interesting and important discussion on this subject took place at the meeting on January 15th, 1925 of the Royal Society of Tropical Medicine

and Hygiene, and is reported in the *Transactions of the Society*, Vol. XVIII, No. 7.

The subject was introduced by Lieutenant-Colonel A. T. Gage, C.I.E., M.B., I.M.S. (retd.)—formerly Superintendent of the Royal Botanical Gardens, Calcutta, and now Librarian to the Linnean Society. The quina-quina bark originally used in 1638 in the illness of the Countess of Cinchon was that of *Cinchona officinalis*, as the species was subsequently named by Linneus in the following century. Reckless exploitation of this species in the Andes, however, led to the importation into Europe at the end of the 18th and beginning of the 19th centuries of other species; in the long run the three survivors were *C. officinalis*, *C. succirubra* and *C. calisaya*. In 1820 quinine was first isolated, whereas the other alkaloids of cinchona were not differentiated until some thirty years later. As it was found that quinine was of approximately equal potency to the crude bark, its additional æsthetic and pharmaceutical properties gave it an overwhelming advantage, and quinine became the sole and standard remedy for the treatment of malaria.

So far all the bark required had been imported from South America; but by the middle of the 19th century the reckless exploitation of this source of supply led the British and Dutch governments to seriously consider the position. In India the species introduced about the 'sixties of the last century was almost exclusively *C. succirubra*,—a species much poorer in quinine content than *C. officinalis* and *C. calisaya*. The poorness of the quinine yield from this species led to anxiety on the part of the Indian Government, and in 1865 to the appointment of three Commissions in the presidencies of Bengal, Bombay and Madras, to investigate the relative therapeutic value of the different cinchona alkaloids. As the malarial parasites were not discovered until 1881-1890, the trials carried out were purely clinical, and could not be controlled by microscopic examinations.

Of the three Commissions, the Madras one reported most fully. They treated over 1,100 cases in 1866 and nearly 2,500 cases in 1867. They concluded that "beyond doubt ordinary quinine sulphate, chemically pure quinine sulphate, and quinidine sulphate possessed equal febrifugal power; that cinchonidine sulphate was only slightly less efficacious; and that cinchonine sulphate, though considerably inferior to the other alkaloids, was notwithstanding a valuable remedial agent in fever." The other two Commissions reached practically identical conclusions.

The Indian Government now adopted the policy of officially encouraging the use of the alkaloids other than quinine. In 1875 the Madras Government was called upon to explain to the Secretary of State for India why, despite these orders, quinine was being used. Their reply is interesting; it was to the effect that owing to the great value of quinidine and cinchonidine therapeutically the price of both these alkaloids, at £4 per lb. was considerably higher than that of quinine, at £3 4s. per lb. In other words quinine was being used because it was cheaper.

In 1873 sufficient *C. succirubra* bark, grown in India, was available to supply cinchona febrifuge (total alkaloids) for clinical test, and in that year 1,000 cases were experimentally treated with the febrifuge containing the total alkaloids. It was reported that cinchona febrifuge was of equal potency to that of the isolated alkaloids and that it could be sold at Re. 1 per oz.

In the meantime the Dutch had gone ahead with great thoroughness. Selecting the quinine-yielding species for their Java plantations, their output had grown to such an extent that the price of quinine fell from £1 per oz. in 1878 to less than £1 per lb. in 1890. The *Cinchona* species rich in quinine were introduced more and more into the Indian plantations. Cinchona febrifuge of those days "rather resembled powdered bathbrick"; quinine was a clean white crystalline powder; and—accordingly—quinine again pre-

vailed. By 1903 the Indian bark was being used for the extraction of quinine rather than for the production of cinchona febrifuge, and the composition of Indian cinchona febrifuge in 1922 was as follows:—

Quinine	..	10.5
Cinchonidine	..	7
Quinidine	..	16
Cinchonine	..	23
Amorphous alkaloid	..	33
Non-alkaloid	..	1.5
Insoluble	..	3
Water	..	6 parts per 100.

The influence of these various factors increased the sale of quinine and steadily reduced the sale of cinchona febrifuge, which fell at the Bengal factory from 11,000 lbs. in 1881 to 1,600 lbs. only in 1912. With the war the demand for quinine and cinchona febrifuge greatly exceeded the possible supply, and the price of quinine again rose steeply.

Thus the universal use of quinine in malaria in medical practice to-day is the result of many different causes, only one of which is its therapeutic efficacy. Let us now take a detached view of the situation, counsels Colonel Gage. If we could take a bird's-eye view of the immense malarial tracts of this planet, what should we see? "We see a very small number of patients in comfortable circumstances, who can command the service of skilled physicians and nurses, and for whom the cost of a remedy is of no importance. We see a small number of sufferers in civil and military hospitals, who also have at their service skilled attendants and may have a choice of alkaloids. But far exceeding these, so to speak selected cases, we see a vast multitude of human beings who live on continuous sufferance of the pestiferous mosquito, who may ever see a hospital or a medical man, and to whom the Cinchona alkaloids are unknown or unobtainable at a price within their scanty means." For the first two classes we may prescribe the alkaloid of election, for the great mass of malaria-stricken humanity other factors come into play. "Until it is accepted beyond all doubt that one particular alkaloid or combination of alkaloids is so far superior to any others in the treatment of attacks of any kind of malaria as to exclude consideration of the others, then the fittest alkaloid or combination of alkaloids for the overwhelming mass of sufferers will be that which can be produced in the greatest abundance at the least possible cost; can be distributed at the least possible price; and can be used with the least possible medical supervision." But the medical profession has demanded quinine, and Cinchona growers and chemists have adapted their plant and plants accordingly.

If it be proposed to replace quinine with—for instance—quinidine what will happen? In the bark of *C. ledgeriana* and of its hybrid with *C. succirubra* quinidine only constitutes some 7.5 per cent. of the total alkaloids. To replace quinine by quinidine, weight for weight, about five times as much bark will have to be used and the price of quinidine may well rise to heights at present undreamt of. Or else selected species of *Cinchona* rich in quinidine will have to be planted, will have to mature over several years before they can be utilised, and, in the meantime "it may be doubted whether happy expectation would correctly describe the condition either of the Cinchona industry, or of the medical profession, or of the malaria-ridden community."

From the botanical and commercial points of view, therefore, Colonel Gage concludes that quinine should remain the alkaloid of election, unless there are overwhelming therapeutical reasons for replacing it. But for the masses there is no reason why the limited and costly supplies of quinine should not be supplemented on a large scale by the re-introduction of the original cinchona febrifuge, i.e., of the febrifuge containing the total alkaloids of *C. succirubra*.

It will be seen that Colonel Gage's paper is a very important and thoughtful contribution to one of the

most difficult medical problems in India. It was followed by a paper rich in wit and wisdom by Lieutenant-Colonel Clayton Lane, I.M.S. (ret'd.).

How does quinine act? No one knows. From 35 to 93 per cent. of it disappears after administration without trace, metabolised in the liver, intestines and kidneys. After an intravenous injection of quinine there is only some 10 to 15 per cent. of the injected dose still in the circulating blood one minute later. Bass found that malarial parasites were killed *in vitro* in a dilution of 1 in 2,666; corresponding to the oral administration of 30 grains in man; yet this strength is from 50 to 150 times greater than the concentration needed in the blood *in vivo* to effect a cure. The evidence is still confused, but its general trend is to shew that, instead of quinine exerting a direct plasmodicidal effect upon the parasites, it acts indirectly through some metabolic mechanism of the body.

Further where does quinine act? No one knows. Does it affect only parasites which are extra-cellular or those which are intra-cellular, or both? The answer is a confession of ignorance.

What is the best salt of quinine to use? No one knows. Most practitioners prefer the freely soluble salts for oral administration, yet the general evidence is that quinine is not absorbed from the stomach but from the small intestine, and that, whatever form be administered by the mouth, it is first converted into quinine base before absorption. But if it be not quinine itself but a quinine-metabolite that kills the parasites, the matter is rendered still more complicated. Perhaps quinine when administered orally is a protoplasmic poison; it is partly destroyed in the small intestine, such of it as escapes such destruction being destroyed in the liver, and the kidneys flinging out of the body such quinine as the metabolic processes have failed to destroy. An incidental result of this process of destruction may be the production of a quinine-metabolite which destroys the malarial parasites.

Leading French writers have for years been ardently advocating the hydrochloride owing to its solubility, yet in Algeria the official State issue is now as tablets of quinine sulphate. This naturally leads up to the tablet conundrum. Are sugar-coated tablets reliable or not? There seems to be considerable difference of opinion.

Is intramuscular quinine injection a dangerous procedure? The *Lancet* in an editorial considered that the only condition contra-indicating intramuscular injection in practice is debility. Yet there is no reason for thinking that MacGilchrist's guinea-pigs (or Acton's and Chopra's rabbits) were debilitated, and there is clearly more behind necrosis than that. "It is undoubtedly possible to push into a patient with a syringe a lasting conviction that if it has to come to a choice between a bitter taste and a bitterly painful experience, it is better to take quinine by the mouth after all."

Why is primary malaria so easy to cure, and old standing malaria so difficult to eradicate? We need information badly. The whole trend of recent evidence shews that the primary attack of malaria experimentally induced for therapeutic purposes in a general paralytic yields promptly and rapidly to treatment, whereas naturally acquired malaria in the tropics is often very difficult to treat.

Does the season of the year affect the efficacy of quinine treatment? There seems to be some evidence that it does.

At what times should quinine be administered? There is no settled answer. If quinine acts by directly killing the merozoites set free into the blood on rupture of the malarial schizont, then we must aim at having a maximum concentration of quinine in the blood at the time when the merozoites are set free;—the old established view. But if it is not quinine but a quinine-metabolite that acts, then we may require a continuous supply at a low concentration, rather than an intermittent high concentration.

Finally, concludes Colonel Lane, the case for quinine *versus* quinidine is not yet fully proved, whilst apart from the commercial disturbance which might ensue if quinidine were to replace quinine, there is risk that if the available supplies of quinidine are to be used up for treating malarial patients, sufficient will not be available for those cardiac cases for whom it is perhaps essential.

The discussion which followed the papers by Colonel Gage and Colonel Lane was full of interest. Mr. Bernard Howard spoke as a chemist. In general he had found the sugar-coated tablets produced by English manufacturers soluble and satisfactory. The case was very different with samples of tablets from the Indian market; they might consist of anything,—apparently even of concrete. With regard to Colonel Gage's historical summary there was one omission. In 1876 the question came before the Dutch Government as to whether the use of a cinchona febrifuge containing the total alkaloids might not be an improvement upon the extraction and use of quinine. Dr. de Vrij's report on this matter shewed that the febrifuge shewed such enormous variations in composition that the official decision was come to to try and increase the production of quinine and reduce its price rather than to fall back upon the febrifuge. Samples of Indian febrifuge which he had analysed also shewed considerable variation. Speaking as a chemist he considered that a return to the febrifuge would be a mistake. The chemists were aiming at increased purity of quinine and reduction of cost. The moment febrifuge was thrown upon the market as an unstandardised product, the road was open for adulteration. "As a chemist I feel bound to protest against the alkaloids being jumbled up again, and also against the possibility of the most abominable adulteration among certain of the native houses in India, because I have had painful experience of what certain unscrupulous Indian druggists can do if they have the chance."

Sir David Prain spoke of old days in India when "one did not make suggestions to officers in one's medical service older than oneself." Matters to-day were apparently different. Twenty-five years ago he used to ask medical officers in India of his own standing in the service how much quinine they supposed that the human system could assimilate. The answer was "What does it matter, so long as we give sufficient?" But, as he had had to provide the quinine, and as he regarded every grain given in excess of what was required as a grain wasted, he had given serious consideration to the question. He entirely concurred with Colonel Gage in desiring to see cinchona febrifuge more widely used. The amorphous alkaloid contents had always interested him. In India in the old days the officers of the medical services demanded and got quinine; but the planters and missionaries, to whom economy was an object, wanted febrifuge for their servants and clientele. At first febrifuge containing the total alkaloids was issued; and planters and missionaries alike spoke highly of it. Then residual alkaloid (total alkaloid *sine* quinine) was issued; planters and missionaries reported that they much preferred this product to the former one. Next the cinchonidine was taken out; so that the febrifuge issued was *sine* quinine and *sine* cinchonidine; this was issued only to missionaries (presumably because it was the cheapest of the three?). They reported that it was 100 per cent. more efficacious than the previous supply. In fact they preferred a product rich in amorphous alkaloids.

At one time he regarded the introduction of the quinine tablet as "one of the most dangerous things that could be done by pharmacy." "Fortunately for India the fate of the quinine which the pharmacist who offers and the physician who prescribes in tablet form endeavour between them to lose, is determined not by them but by the Indian conservancy attendant,—in this, as in much else,—an artist in his craft."

Professor Swellengrebel referred to sugar-coated quinine tablets of Italian manufacture. Several hours'

immersion of these tablets in water had left them unaffected, although they were of recent manufacture and perfectly fresh. After twelve hours the sugar coating had been partly dissolved and some of the quinine had been dissolved, but part of it was still adherent to the undissolved coating. He agreed entirely with Colonel Clayton Lane as to the undesirability of intramuscular quinine; during the 1924 epidemic in Russia they had been forced to give quinine intramuscularly, not for its better therapeutic effect by this route, but for economic reasons. His experience in the treatment of general paralysis of the insane by experimentally induced malaria had been the same as that of previous speakers; the malaria so induced was exceedingly amenable to treatment.

Dr. H. A. D. Jowett, speaking as a chemist, advocated sugar-coated tablets of the neutral salts in preference to others. Some of the French tablets which he had examined appeared to be entirely coated with French chalk instead of sugar. "French chalk is very good for polishing a ballroom floor, but I am not aware that it is satisfactory therapeutically." It was very easy to test a sugar-coated tablet for solubility; it should be placed in water in a test-tube and kept at body temperature and from time to time gently shaken; the sugar coating should then dissolve without residue.

Dr. W. H. Martindale considered that it should be possible to determine whether the active agent in quinine therapy was the quinine itself or a quinine-metabolite; experimental testing of the blood should determine it. Quinine base administered orally in salol or stearine-coated tablets, was as efficacious as any quinine salt. He did not see the point of sugar-coated tablets. "Someone found a tablet which was indifferent to acids, and even to striking with a hammer. That, I think, was a French make, not a British product."

If 5 or 8 grains of quinine salt in relatively concentrated solution were added to a volume of 1 or 2 per cent. sodium bicarbonate solution (representing the body fluids) you got an extraordinary coagulum of dense white precipitate of quinine base. Could one imagine anything more unsatisfactory for intramuscular injection than such a mess? Dr. Wenyon had spoken to him of having had to "carve quinine out of the tissues after injections of it have been given." Surely some form of quinine more suitable than an acid salt could be found for intramuscular use.

Sir Leonard Rogers said that a study of the records shewed that James Lind in 1765 had treated 400 cases of remittent malaria in Bengal with 2-gramme doses of cinchona bark with complete success. In general he advocated quinine for oral use, the intramuscular use of cinchonine bihydrochloride and the intravenous use of soluble quinine salts being reserved for special cases. Sir Harry Waters said that on his railway he had been forced to abandon the use of cinchona febrifuge tablets. They had persisted in trying them for two years but had had to go back to quinine, as those taking the febrifuge were incapacitated from severe headache.

In replying to Mr. Howard's remarks, Colonel Gage said that he advocated the use of cinchona febrifuge to supplement, not to replace the use of quinine. The risks of variation of composition and of adulteration would have to be faced. Quinine itself was frequently adulterated; he had found spurious tablets being sold in Bengal which contained only a quarter of a grain or even none at all. He had often heard of nausea as following the use of cinchona febrifuge, but never before of headache severe enough to necessitate stoppage of work.

It will be seen that this symposium of opinions by a gathering of eminent authorities leaves the question of the best method of treating chronic and relapsing malaria still unsolved.

Rectal Injections of Quinine.

THE value of rectal injections of quinine has been a subject of so much dispute that it is interesting to read an account of the careful experimental work done by

Dr. William Fletcher of Kuala Lumpur. The results are concisely stated in the following summary.

"In the year 1923 we published an account of the unsatisfactory results which follow rectal injections of quinine, and of the pain and tenesmus which they sometimes cause. Our conclusions were greatly at variance with established opinion and, in consequence, the Medical Research Council and the Medical and Sanitary Advisory Committee of the Colonial Office asked that further investigations should be made.

(a) First, we gave injections to guinea-pigs. These were returned too quickly to allow satisfactory absorption of quinine to take place.

(b) Secondly, we gave a series of rectal injections, two each day for at least six days, to a couple of groups of men infected with malaria. The first group, consisting of ten patients, received 20 grains of quinine bihydrochloride, dissolved in 4 ounces of salt solution, at each injection. The second group, which comprised six men, received the same quantity of quinine, but it was dissolved in 8 ounces of saline, instead of 4 ounces.

In the first group, out of seventy-one injections, sixty-one were returned during the first twenty minutes; none was retained permanently; the average time of retention was thirteen minutes. Quinine was found in the urine after only thirty-six out of 132 injections.

In the second group, out of thirty-two injections in which the time was noted, three were retained permanently and the average time of retention, for the remaining twenty-nine, was seventeen minutes. Twenty-five were returned within twenty minutes. Quinine was found in the urine after thirty-three out of fifty-seven injections. In many of the cases where quinine was present the amount was very small. When 10 grains, twice a day, were given by the mouth, instead of 20 grains by the rectum, abundant quinine appeared in the urine.

(c) In eleven out of the sixteen cases of malaria in the two groups, 40 grains of quinine bihydrochloride, given daily *per rectum*, failed to get rid of asexual parasites within a week. Quinine was then administered to these patients by the mouth, with the result that the parasites quickly disappeared.

(d) Rectal injections, containing $2\frac{1}{2}$ grains and 5 grains to the ounce, were given to a healthy European but he was unable to retain them for more than ten or fifteen minutes, and the absorption from 60 grains injected into the rectum appeared to be inferior to the absorption from $2\frac{1}{2}$ grains given by the mouth.

(e) The presence of mucus and membranous shreds, passed by patients undergoing treatment with rectal injections of quinine, demonstrates the irritating action of the drug upon the mucous membrane.

Final Conclusion.—In view of these results we reiterate our former conclusion (Fletcher, 1923) that "quinine is too irritating for administration *per rectum*. It should not be given by this route if any other means are available."

Malarial Infection as it occurs in Late Pregnancy: Its Relationship to Labour and Early Infancy.

By Drs. D. B. BLACKLOCK and R. M. GORDON.
Annals of Trop. Med. and Parasit., 1925, Vol. XIX,
No. 3, Sept., 30th, p. 327.

THIS paper is an extremely important contribution to our knowledge of the pathology and epidemiology of malaria; in fact it is not too much to say that it should be read in detail in the original by every medical man working in an area where malaria is rife among the female population of the locality. Further, the beautiful colour plates with which it is illustrated will be invaluable to the laboratory worker.

Working in Sierra Leone, the authors shew that malarial infection of the placenta in women in confinement is very common; it occurs in some 36 per cent. of cases—an enormously high percentage. The prevalent type of infection is with the parasite of malignant tertian malaria.

In spite of this fact, however, infections demonstrable in the peripheral blood are in comparison few, not only among women in labour, but also in non-parturient women, adult males, and even in children. This difference between the intense infection of the placenta and the relative infrequency of parasites in the peripheral blood the authors attribute to a relative immunity of the peripheral blood (in malignant tertian infections).

Gametocyte production is not observed in the infected placenta; these women do not constitute a danger to the community so far as the spread of malaria is concerned. Further, pathological effects upon the mother may be lacking; she may be in relatively good health.

Amongst the infants born of such infected mothers, some may be born healthy, may survive and shew but little ill effect. On the other hand the series observed contains proof of a very complete association between maternal infection with malaria in the placenta, and death of the child either *in utero*, or within 7 days of birth.

Congenital infection of the child direct from its mother and from the infected placenta is very rare, if indeed it occurs at all it is probably due to accidental tears or ruptures of the placenta permitting parasites to pass through into the foetal circulation. (That congenital malaria does occur—although perhaps very exceptionally indeed—is shown by several instances quoted in the literature of recent years.)

What does occur is not congenital malarial infection of the foetus *in utero*, but its death from malnutrition or from toxæmia. Toxic substances appear to be absorbed by the child from the intensely infected placenta of the mother, whilst so enormous a proportion of the red blood corpuscles in the placental circulation of the mother is destroyed by the parasites, that the nutrition of the foetus is gravely interfered with.

We have seen of recent years scarcely any paper on the subject which brings home to us more clearly the sequence of the events in and the pathology of malaria in advanced pregnancy. We gain a vastly interesting and very informative picture of the maternal circulation in the placenta blocked and partially paralysed by massive malarial infection; of the foetal placental circulation, not indeed infected with malarial parasites, but deprived of necessary nutrition, with the consequence of foetal deaths, still-births, and deaths within the first week of life. Early infant mortality in malaria infested districts in the tropics is enormous; is this pathological picture representative of a very important factor in its causation?

The authors are to be warmly congratulated upon a most important and most informative contribution to the question of the role of malaria in maternal and foetal mortality.

The Transmission of Oriental Sore by Sandflies.

A FURTHER contribution to this interesting problem appears from Drs. S. Adler and O. Theodor in the *Annals of Tropical Medicine and Parasitology* for 1925, Vol. XIX, No. 3, p. 365.

In Palestine the epidemiological evidence in favour of the transmission of oriental sore by the sandfly *Phlebotomus papatasi* has so far been ambiguous, but rather in its favour. In the village of Artuf oriental sore was first found in 10 patients by Dostrowsky early in 1925. The population of the village consists of 114 souls and in 1923 the local physician, Dr. Jaruslawsky had noticed the absence of sandflies in the village. That summer however sandflies became a perfect pest in the village. In June 1924 *Phlebotomi* were found in every house, the species present being *P. papatasi*, *P. minutus*, and *P. perniciosus*, the first in overwhelming numbers.

In October 1924 the authors commenced an examination of *P. papatasi* captured in the wild state in Jericho, the reputed endemic centre of oriental sore in Palestine. Of 175 females dissected during the months of October to December, 3 shewed motile *Herpetomonas* in their

mid-gut. In June 1925 a batch of 175 female *P. papatasi* from the same source was dissected. In one typical herpetomonad flagellates were found in the mid-gut, where swarms of them appeared to be attached to the posterior surface of the oesophageal valve, and others in the oesophageal diverticulum. The thin-walled oesophageal diverticulum in *Phlebotomus* is an important structure, since in fresh dissections waves of peristalsis can be seen to pass along it propelling its contents into the pharynx and buccal cavity, upon which it practically opens.

Permanent stained preparations were made from the contents of the diverticulum and the mid-gut behind the oesophageal valve. The remainder of the infected material was inoculated into the forearm of a human volunteer by scarification technique at two points on the 26th June, 1925. On the 31st July, 1925 a small papule was noticed on one of the two inoculation sites, so small that it would ordinarily have passed unnoticed. Films from this nodule shewed typical *L. tropica*. This volunteer had previously been in Mesopotamia from 1917 to 1920 without developing oriental sore, and lived in Jerusalem where the inoculations took place, and where no oriental sore of locally acquired origin has yet been reported. Nothing was noticed at the other site of injection, which was examined with negative results.

(The authors are careful to note that the successful experiment proves nothing more than that herpetomonads collected from an infected sandfly found in the wild state will induce a *Leishmania* papule in man. The question of other possible insect vectors remains for consideration. Yet in view of (1) the evidence given by Acton 1919, in Mesopotamia that the distribution of oriental sores upon the surface of the body corresponds with that of oriental sores; (2) of Patton, 1919, 1922, that *Herpetomonas* is present in *P. papatasi* in Mesopotamia and Palestine; (3) of the Sergeant brothers, Parrot, Donatien and Beguet, 1921, who infected a human volunteer in a non-endemic centre with crushed material obtained from sandflies collected at Biskra, a notoriously infected centre for oriental sore; (4) of the way in which the habits and environment of *P. papatasi*—a sandfly of desert habitat—fit in with the epidemiology of oriental sore; it would appear as if the chain of evidence is almost complete. It would appear that active development of *L. tropica* occurs in the mid-gut of the female *P. papatasi*; that the infection in the fly centres in the anterior end of the mid-gut and especially on the posterior aspect of the oesophageal valve; that the oesophageal diverticulum becomes infected, and that the infection is probably passed back to man when the fly feeds again. Crucial experimental proof, however, is still to be provided. In recent work at the Calcutta School of Tropical Medicine it is interesting to note that locally captured and bred-out females of *P. argentipes*—the possible carrier of kala-azar—have shewn no flagellate infection when fed upon a patient with oriental sore; and that the geographical distribution, habits and habitat of the two sandfly species appear to be entirely different).

The Borocaines, a New Class of Local Anæsthetics.

By A. J. COPELAND, M.A., M.B., D.P.H., B.Sc., and

H. E. F. NOTTON, B.Sc., A.R.C.S.

British Med. J., 26th Sept. 1925, p. 547.

THE disadvantages of cocaine as a local anæsthetic scarcely need to be enumerated; it is toxic, it is expensive, it is apt to lead to the cocaine habit, it may prove irritant. Hence the search for an efficient substitute, free from these disadvantages, goes on. In this article Drs. Copeland and Notton summarise the results of their work with the borocaines, work carried out at Cambridge under the help and advice of Professor W. E. Dixon, F.R.S., and Professor Sir William Pope, F.R.S., on the pharmacological and chemical sides respectively.

It has been shewn that ethocaine hydrochloride (novocaine) has a strong affinity for sensory nerve fibres, but has very little action on sensory nerve fibrils in the eye. When it is dissolved in rabbit or horse serum, or even in a solution of egg white, however, its anæsthetising action is increased some twenty-fold; whilst if the proteins present in the solution be removed by boiling, it can be shewn that this is due to the action of the *alkali* present. In fact in general even with cocaine, the higher the pH, i.e., alkaline content of the solution, the greater the anæsthetising value.

Now the solutions of high pH value differ from those of low or acid pH value chiefly in that in the former hydrolytic dissociation predominates, with the cocaine present as a base; in the latter electrolytic dissociation predominates, with rapid absorption of the anæsthetic into the general circulation. "The action of a local anæsthetic depends upon the specific selective affinity of its *base* for nerve fibrils. But the different salts of such a base vary greatly according to the acid with which they are combined. If they are combined with strong acids—i.e., such as dissociate electrolytically to a large extent,—the salt is relatively rapidly absorbed into the general circulation and is less effective locally,—i.e., its toxicity is relatively high and its anæsthetic action relatively low. On the other hand, if it is combined with a weak acid which does not electrolytically dissociate to any considerable extent, it is relatively slowly absorbed into the general circulation and is more effective locally, i.e., its toxicity is relatively low and its specific anæsthetic efficiency relatively high. Such salts have a high pH value."

From among such compounds with weak acids the compounds with boric acid—the "borocaines"—were finally selected. These appear to fulfil the conditions required. They are much less toxic than the original hydrochlorides, but often exert more than ten times their anæsthetic action. The borate of beta-eucaine is the most powerful borocaine, being more than ten times as efficient as cocaine hydrochloride. Its toxicity has still to be determined.

It is promised at the conclusion of the paper that clinical reports will follow later. Meantime, as it is obviously of the utmost importance that only reliable supplies shall be placed on the market, "for this reason" state the authors, "the manufacture of the borocaines has been entrusted to the British Drug Houses, Ltd., and this firm is prepared to supply the compounds." Borocaine, the present standard product, is the borate of ethocaine, a stable, white, crystalline powder, freely soluble in cold water, Ringer's solution and normal saline. An aqueous solution has a pH of about 8.0 and is well on the alkaline side of neutrality. It is claimed by Copeland and Notton as "an ideal surface anæsthetic, practically without toxicity and non-irritant." For eye work and dental use a 2 per cent. solution is advised; for operations on the nose and throat a 5 per cent. solution. One tablet dissolved in 1 c.c. of distilled water makes a 2 per cent. isotonic solution, and it is issued in tubes of 20 tablets at 1s. 6d. per tube, or 5 tubes for 6s.

The further reports on "Borocaine" will be awaited with interest.

Melioidosis.

A Disease of Rodents Communicable to Man.

By A. T. STANTON, M.D., M.R.C.P., D.P.H.,
and

WILLIAM FLETCHER, M.D.

It is likely that this disease, which was first described by Whitmore in the *Indian Medical Gazette* in 1912, is more common than it is supposed to be. We give a few extracts from a valuable bulletin on the subject by Drs. A. T. Stanton and William Fletcher.

Melioidosis is very like glanders and the true nature of the disease can be determined only by the cultivation of the causative organism from the lesions, or from the blood, sputum or urine.

It was first recognised as a new disease by Whitmore and Krishnaswami (1912). A year later, Whitmore (1913) published an excellent account of the malady under the title of "A Glanders-like Disease Occurring in Rangoon." Knapp (1915) and Krishnaswami (1917) have made further contributions to our knowledge of this subject. Stanton and Fletcher described new forms of the disease and proposed for it the name "melioidosis" as the physicians of ancient Greece had described it by the name "*Melis*"—a variety of conditions resembling glanders; they called the causative organism *Bacterium whitmori*, in order that Colonel Whitmore's name might continue to be associated with the bacillus which he was the first to isolate and describe.

The disease occurred as a severe distemper among laboratory animals at Kuala Lumpur which broke out towards the end of 1913. The initial symptom was a milky discharge from the eyes and nose which was speedily followed by pulmonary involvement and death. Its connexion with Whitmore's bacillus a disease of man was not suspected. In the year 1917 several cases of the infection occurred both in man and animals; they were due to the same bacillus.

The problem of the way in which man contracts melioidosis remains unsolved. A large proportion of the cases observed by Whitmore, Knapp and Krishnaswami were morphia-injectors; at one time they considered that infection was carried by the syringe and they called the disease "Morphia-injectors' Septicæmia"; but none of the cases which have occurred in Kuala Lumpur have been injectors of drugs.

It has been proved experimentally that animals can be infected by feeding, and as the onset of the disease in several human cases has been marked by very severe gastro-intestinal symptoms, it is probable that in man infection takes place through the medium of food which has been contaminated by rats.

The bacillus has been found in the blood, the sputum, the urine and the discharge from the superficial lesions of human cases, and the lungs are almost invariably affected.

Only a small number of cases has been recognised up to the present time; thirty-eight by Whitmore in Rangoon during 1911-1912, one in Singapore in 1922 and eleven in Kuala Lumpur between 1917 and 1924 (four in 1917, one in 1920, three in 1921, two in 1923, one in 1924). Of these fifty patients, twenty-five were Indians, twenty-three were Burmans, one was a Chinese and one a European; with one exception all were males. Some additional cases have been seen by Knapp (1915) and by Krishnaswami (1917) in Rangoon, since the publication of Whitmore's account of the disease in 1913. It is highly improbable that melioidosis is limited to the three towns where its presence has been detected; but its diagnosis is almost impossible in places where there is no laboratory, and even where laboratory facilities are available the disease may escape recognition by those who are unfamiliar with it.

Though the recognised morbidity rate from melioidosis is very low, the case mortality is very high. So far, only two men are known to have recovered from the disease.

ÆTIOLOGY.—*Bacterium whitmori*, the causative organism of melioidosis, possesses marked characteristics which distinguish it clearly from other pathogenic bacteria. Whitmore has described it in detail and in this short account we shall follow him closely.

The bacilli, as seen in films made from the lesions of an infected organ, are about the size and shape of *B. mallei*. They stain readily with all the usual stains; but they are neither acid-fast nor Gram-positive. With Leishman's stain they show a well-marked bipolar staining, a character which is exceedingly useful in arousing early suspicion of the nature of the infection. When a preliminary examination of films from diseased organs is being made. Growth upon all the usual culture media is rapid and luxuriant; it occurs under both aerobic and anaerobic conditions, though much more luxuriantly under the former. On the surface of liquid

media a pellicle is formed which becomes a tough wrinkled skin in the course of four or five days. The two outstanding features of *B. whitmori* are, first, its motility in young cultures and, secondly, its curious growth on glycerine agar. Cultures on agar containing 5 per cent. of glycerine begin to acquire a wrinkled appearance in a couple of days; the growth rapidly extends until after a week's incubation it has become heaped up and rugose like a thick growth of tubercle bacilli.

Animal inoculation.—Rodents are readily infected by feeding, by inhalation, by subcutaneous inoculation and by scarification of the skin. The subcutaneous inoculation of a freshly isolated and virulent culture of *B. whitmori* will cause the death of a guinea-pig, rabbit or rat, from septicæmia in less than twenty-four hours.

MORBID ANATOMY.—The characteristic lesion of melioidosis is a small yellow, caseous nodule which commences as a collection of polynuclear cells surrounded by a zone of congestion. By the time these nodules have become large enough to be visible to the naked eye, they consist of a mass of necrotic, caseous material containing a great number of chromatin fragments which are the remains of dead nuclei. The nodules have been found in almost every part of the body, except the brain, and they coalesce to form large areas of caseation, particularly in the lungs. They sometimes break down to form abscesses, in the viscera of man, but not in animals. Small abscesses are the commonest lesion in the spleen; in the liver larger abscesses are more frequent.

The lungs are nearly always affected. When the disease is not far advanced, the nodules can be felt, like shot, within the substance of the lungs; they resemble miliary tubercles, except that they are less numerous and more scattered. When the process has gone further the lungs may be filled with large caseous masses; nodules in the lungs very rarely break down to form abscesses.

Symptomatology.—Melioidosis presents no cardinal symptoms upon which to base a diagnosis.

When the infection is very virulent the illness begins suddenly with vomiting, collapse and diarrhœa so severe that a tentative diagnosis of cholera has been made on more than one occasion. The four cases which occurred in Kuala Lumpur, during 1917, all began in this way and all were fatal. In these very acute cases a reaction usually occurs, on the third day the temperature rises and assumes a swinging septic character; in one instance, a patient actually died during the stage of collapse, seventy-two hours after the beginning of his illness. When the initial infection is less virulent, there is no preliminary collapse but fever is high from the commencement, and the patient passes quickly into a typhoid condition. If he survive the initial septicæmia, the organisms establish themselves in various parts of the body where they multiply and form caseous or pyæmic foci. There are nearly always some signs of pulmonary involvement and the lungs are found to be diseased in 90 per cent. of the cases examined after death.

To sum up, some of the most acute cases resemble cholera or plague; others, which have a high temperature from the beginning, resemble malaria, enteric fever or general tuberculosis; yet others find their way to the dysentery wards. If pustules and abscesses appear a diagnosis of acute glanders may be made; while the bone lesions which appear later on, resemble tertiary syphilis or chronic tuberculosis. Delirium is a common symptom, and one unfortunate patient was confined in a cell because he was supposed to be afflicted with acute mania.

A certain diagnosis can be made only by cultivation of the causative organism. A "positive" agglutination reaction is of value as presumptive evidence, particularly if the titre of the serum increases after an interval, but this reaction is obviously of little value in the diagnosis of the disease in its more common acute form.

B. whitmori has been cultivated from the blood and urine of human cases and also from pustules and abscesses when these have been present.

In cases of obscure fever, associated with enlargement of the liver, this organ should be explored with a needle and glycerine-agar slopes and animals should be inoculated with material thus obtained. Whenever an abscess of the liver is aspirated or drained, glycerine-agar and guinea-pigs should be inoculated with the pus. Some cases of abscess of the liver due to *B. whitmori* have been mistaken for amœbic lesions.

The Work of the British Social Hygiene Council.

A FRESH advance has been made in the combating of disease which is signalled by the change in title of the National Council for Combating Venereal Disease to that of the British Social Hygiene Council, which met in the Conference Hall at the British Empire Exhibition, Wembley on the 5th October 1925.

The change in title is significant. In 1913, there was a conspiracy of silence as to the mention of venereal disease in any of its forms. To-day venereal disease is no more interesting from a general standpoint than measles or small-pox, but just as small-pox must be attacked by means of vaccination, so venereal disease must be combated by every known weapon in the arsenal of the medical profession.

The change of title means that those who have organised themselves to fight the imperial menace of venereal disease have now reached the second line of trenches. In England there is reason to believe that new cases of syphilis have fallen by nearly fifty per cent., the evidence being that cases of syphilis presenting themselves for free treatment in 1920 numbered 40,000; there were only 23,000 cases in 1923, who so presented themselves in England and Wales.

This result has been obtained by efforts made jointly by the Ministry of Health, the local authorities and the British Social Hygiene Council, which have co-operated to ensure that the infected members of the public should seek and continue the free treatment provided for them. During the last eight years over 15,000 lectures have been delivered and over 3 million persons have been enlightened through the cinema film and the spoken word.

Until quite recently the immediate problem was so serious that little more could be done than present a frontal attack to the disease. It was the policy of free clinics that prevailed but now it has become possible to co-ordinate effort throughout the Empire. England is following the Dominions in the change of title and at last the broad view can be taken that while venereal disease must be treated and combated as vigorously as ever when it appears, the main policy of prevention which has been preached for over a generation by leaders such as Sir Ronald Ross, and many others, can become a definite policy.

What the Council stands for to-day is that every effort shall be made to ensure that general conditions of life shall be so improved that the risks of contracting disease shall be enormously reduced. This is no pious hope but an expression of opinion based on the work accomplished by General Harrington when he took command in Constantinople. By improving conditions, General Harrington reduced the incidence of syphilis by one half in the troops under his command. The view of the British Social Hygiene Council is that in the civilian population the same result can be achieved and there is the belief that other diseases such as tuberculosis will decrease in the same way as syphilis will decrease once social conditions are improved.

The Meeting at Wembley Exhibition means that the British Social Hygiene Council is greatly extending its line of attack. Instead of merely providing help for those who have been victimised it is determined so to organise public life that children will be prevented from ever becoming victims. What has hitherto been

its main objective will be pursued as vigorously as ever. Venereal disease will be attacked wherever it arises, but so much progress has been made in the last years that the Council is now able to supplement its remedial measures by carrying out the ideal which all along it has had in mind of so altering social conditions that there should be no reason for these diseases ever to be contracted.

The interest shewn by India in the work of the Council was shewn at the meeting on the 7th October, 1925, which dealt with the problems of venereal disease in India.

Lord Willingdon, despite the many claims upon his time, has acted for some time past on the India Committee of the British Social Hygiene Council and is now Chairman of what is termed the Imperial and International Questions Committee of that body. In this capacity he has taken a very prominent part in combating venereal disease throughout the Empire, confining his attention more particularly to Bombay and Madras where, as administrator, he had fullest knowledge of the evil which is causing untold suffering, not only throughout the Empire but all over the world.

Knowing from close at hand information the appalling ravages which various diseases make among the people of India, he said to a representative of *Reuter*:

"I welcome the suggestion of becoming Chairman of what was originally the India Committee of the British Social Hygiene Council and which is now developed into the Imperial and International Questions Committee of that body, for it has given me an opportunity of keeping up my interest in the well-being of the people of India. From personal experience, I am fully aware of the magnificent work which is being done by the medical advisers of the Indian Government who prevent disease of all sorts. Scourges such as plague, malaria, cholera and hookworm have already been brought under control and it is not the fault of the medical profession that to-day another disease has not been completely eliminated from the country. Unhappily year by year venereal disease is becoming more prevalent in India, especially in the more commercial rather than industrial centres. I am convinced that two objectives must be borne in mind. The disease must be fought directly wherever it raises its head, but after-conditions must be so improved that the danger of individuals contracting it must be reduced."

"What must be remembered is that the question of venereal disease is one directly affecting the public health and is of equal importance as such terrible scourges as plague, malaria and hookworm. It is perhaps in some ways even more important than these. Despite the work of the British Social Hygiene Council, ignorance still prevails as to the danger incurred. The length of the period of infectivity has led to its becoming widely spread in ignorance and in all innocence, and this directly affects the quality of the succeeding generation. The aim of the British Social Hygiene Council is now twofold. It aims as zealously as ever to seek out and destroy the disease wherever it exists. It has achieved the magnificent result that it now is everyone's opinion that this objective should be worked for, but it has taken an important step further as is signalled by its change of title from the National Council for Combating Venereal Disease to indicate to the public that all classes of venereal disease must be attacked by the same type of method as other diseases must be attacked. This year's meeting at Wembley marks a grand stage in advance. It demonstrates all over the world that the British Social Hygiene Council at any rate recognises that venereal disease can only be eliminated if the general standard of public morals is raised. The mistake must not be made to believe that there is to be any relaxation in the specific frontal attack that has been made and is being made by the Council.

The Council, however, is of opinion that the time has now come when it is desirable greatly to broaden the basis of its attack. Syphilis and gonorrhoea need special machinery for their elimination, but I am convinced

that means adopted to combat them will have their valuable effect on other scourges such as tuberculosis and so forth. While perfect environment does not mean perfect health, improved environment and improved conditions unquestionably lead to a reduction, if not eventually to the elimination, of disease. So far as India is concerned we are at present only in the initial stages. We know that a large amount of the infant mortality from which the provinces suffer is due to infection through venereal disease, and I trust that the coming visit of the small commission of experts which we propose to send under the auspices of our Society will be able to help in giving the best advice as to how to grapple with this problem, in order that we may assist in securing more health and better vitality among succeeding generations in India in the future."

Following the Wembley Congress organised by the British Social Hygiene Council, a meeting was held in Paris of the Union Internationale contre le Peril Venerien where important decisions were taken with a view of further combating venereal disease. Great Britain, France, Germany, the United States of America and twelve other countries were represented by delegates from the recognised Social Hygiene organisations, by delegates from the various National Red Cross Societies and by a number of official Government representatives.

Of the many important decisions reached, the most striking was the unanimous decision that the regulation of prostitution was inconsistent with efforts to eliminate venereal disease. It will be remembered that this same point was brought out so long ago as 1913 at the International Medical Congress held in London. In Paris the system of control of prostitution was condemned purely on medical grounds, thus after 12 years endorsing the decision reached in London. The Congress dealt particularly with the problem of eliminating disease from the mercantile marine, with the measures which should be taken in connection with frontiers, with the problems of prostitution and the problem of the disease in connection with emigration. Apart from the purely medical aspect there was the important advance that certain of the shipping interests agreed cordially to co-operate by financial assistance with the measures recommended in the mercantile marine.

The Technique of Supra-pubic Prostatectomy.

From the clinic of Prof. Hugh Cabot, University of Michigan, Ann Arbor, U. S. A.

By BASIL HUME, M.B. (Lond.), F.R.C.S. (Eng.).
Lancet, May 9th, 1925.

THE general management of cases of supra-pubic prostatectomy has remained almost unchanged in England since the operation was first introduced by Freyer, with the single exception of the modification of the "open operation" described by Sir John Thomson-Walker, and by Judd, of the Mayo Clinic.

Dr. Hume had the good fortune to work for a year with Prof. Cabot.

On admission to hospital bladder drainage is instituted in all cases as a routine measure. This is done either by the indwelling catheter or by supra-pubic cystotomy, and is irrespective of there being urinary infection or marked residual urine.

If the residual urine is infected, but the patient's general condition good and his renal function tests satisfactory, the case is usually a better operative risk than a patient in a similar condition but with uninfected urine, because in the former case he has acquired an active immunity to such organisms throughout his urinary tract.

In Prof. Cabot's clinic two tests of renal function are employed, the blood-urea and the phenolsulphonephthalein. These are considered in conjunction with the general physical condition, the blood pressure, and the volume of urine secreted in relation to the fluid intake in determining the patient's fitness for operation.

The *blood-urea examination* indicates the degree of retention of the nitrogen metabolites; 0.2 per cent. is taken as a normal value and 0.4 per cent. as a high normal.

The *phenolsulphonephthalein estimation* is a test of the efficiency of renal excretion, and was devised by Rowntree and Gerharty. It is based upon the specific selective power of the renal epithelium to excrete even small doses of the dye, and is capable of accurate quantitative estimation. That it has not come into general use in this country may be due to a misconception of the technique. The test is performed as follows:—The patient takes from 200 to 400 c.c. of water half an hour before the test; 1 c.c. of a solution of phenolsulphonephthalein, containing 6 mg. of the dye to the cubic centimetre, is injected intravenously and the time noted. The catheter is allowed to drip into a white kidney basin or a cup containing sodium hydroxide solution and the time of appearance of the dye noted. The urine is then collected in a clean bottle for one hour from the time of appearance (not the time of injection as is sometimes the case) and a further specimen collected for the second hour. Enough sodium hydroxide is added to each specimen to make it strongly pink without precipitating the phosphates. The amount of dye excreted is estimated by comparison with a known standard in a colorimeter. An appearance time of from three to six minutes is normal and a total function for the two hours of 80 per cent. or over. The total function should be at least 50 per cent. before prostatectomy is performed. The appearance time alone does not give any very reliable information. Sometimes a small quantity of dye comes through fairly early in a damaged kidney. When the appearance time is long, but the total function is good, it means that the catheter is not in the lowest point of the bladder, or that a large post-prostatic pouch is present.

A soft, red rubber catheter is introduced and tied into the bladder, the eye being at the lowest point at which it will just run. It is then connected by fine tubing with a bottle attached to the side of the bed.

The catheter is left in until the patient is ready for operation. A few days after its introduction a transient rise of temperature, from 100° to 103°, will occur, and last one or two days. This reaction is an almost constant one, and is due to the production of a mild grade of cystitis. In cases that are drained it is found that the cystitis following prostatectomy is much less marked than in the undrained ones. When the renal function tests are satisfactory such a case is usually ready for operation about one week after the reaction has subsided.

If for any reason the indwelling catheter has to be removed, or if the patient is a poor operative risk, either clinically or by renal function tests, and prolonged drainage is likely to be required, the surgeon should proceed at once to drain the bladder by suprapubic cystostomy.

The bladder is distended in the usual way, and a mid-line incision made commencing one finger-breadth above the upper border of the symphysis pubis. This lower limit should not be transgressed. When the extraperitoneal, or perivesical fat, has been reached, the surgeon when incising or tearing through it should avoid any downward extension, in order not to open the loose cellular tissue of the retro-pubic space of Retzius.

At this stage of the operation the lower limit of the parietal peritoneum will be seen as a fold on the surface of the bladder. It should be pushed upwards and gently stripped from the bladder with the finger. The bladder is next secured with tenaculum forceps or retaining sutures and incised in a vertical direction as high up as possible. The bladder is explored with the finger and the condition of the prostate investigated. Calculi, if present, are removed. A "de Pezzer" catheter is introduced, the mushroom end being just within the bladder, and the incision is sutured with catgut commencing below. The suture is at first through and through, but on reaching the catheter it is reversed and carried back to the lower end as an infolding suture through the muscle coat

only. It is tied at the point of commencement. The abdominal wall is then closed in the usual way.

Drainage is maintained by simple syphonage. If done for acute retention the bladder is not completely emptied, the catheter being clamped, and released at intervals for gradual evacuation. The bladder receives daily irrigation by alternate injection and aspiration of either boric lotion or 1 in 10,000 silver nitrate.

Prostatectomy.

The right forefinger is introduced through the internal sphincter to dilate it, and the mucosa of the prostatic urethra "cracked" immediately below. This is done along the line of least resistance, usually on the anterior or lateral wall, and the line of cleavage is found. The enucleation is then completed in the usual manner, assisted by a finger of the left hand in the rectum.

Great importance is to be attached to the proper control of hæmorrhage. Bleeding is usually very free.

The method used for the control of hæmorrhage in the clinic was the hæmostatic bag of Hagner or Pilcher. As soon as all the adenomatous tissue has been enucleated a special sound (Hagner's) with an olive tip, or any well-curved sound, is introduced through the urethra and the tip made to appear in the incision. The tube connected with the bag is affixed to the olive tip, and the sound withdrawn carrying the bag with it, but leaving in the case of the Hagner bag a cord, and with the Pilcher bag the suprapubic tube, for the purpose of subsequent removal. Traction is made on the tube and the bag drawn down into the prostatic cavity carrying with it the mucosa and any lacerated tissue, thus preventing scar contracture at the internal sphincter and promoting the subsequent epithelialisation of the cavity. Air is then injected with a bladder syringe and the bag distended sufficiently to compress the cavity. The tube is then clamped and subsequently tied, the assistant maintaining steady traction on it throughout the operation. The bladder is inspected and all clot and debris removed. A large rubber drainage-tube is inserted and fixed in position with a stitch, the end being left long so that a tube can be connected for syphonage. This completes the two-stage operation, while the one-stage operation is completed in the way described under suprapubic cystostomy.

Dressings are applied and the end of the tube held by the assistant is attached to a cage, invented by Cabot, which maintains traction but still allows the patient to move. It consists of a tripod with a V-shaped rubber-covered base which is applied to the perineum. A large pad of cotton-wool is placed within the frame to support the scrotum. Tension is released from the bag and the cage removed after 18 to 24 hours, though this may be done after 8 to 10 hours if much discomfort is caused. Should bleeding recur the cage can easily be replaced. About 24 hours after operation the air is released and the bag given an hour to collapse and then removed in the following manner: The drainage-tube is first withdrawn, and the portion of the urethral tube projecting beyond the meatus is cleaned with spirit lotion and then lubricated with K.-Y. antiseptic jelly. Gentle traction on the supra-pubic cord or tube will readily remove the bag. A de Pezzer catheter is introduced into the bladder and any small clots removed by the injection and aspiration of boric lotion with a syringe. This also shows that the catheter is properly placed in the bladder for syphonage, which is then instituted, and should keep the patient quite dry. The scrotum is supported by a suitable suspensory bandage, as it appears that support tends to minimise the chances of epididymitis. This complication was rare in the clinic, and bilateral vasectomy was not considered necessary.

The subsequent care of the patient is as follows: Daily injection and aspiration of the bladder with boric lotion, and the urethral injection of 15 c.c. of a 1 per cent. solution of mercurochrome. This procedure aims at introducing an antiseptic into the prostatic space where infection is most likely to commence. All patients are put on extra fluids, and on 30 gr. of hexamethylene

a day from the time of admission. The de Pezzer is replaced by a smaller catheter after four or five days, and at the end of eight to ten days a temporary clamp is applied to it for a short time and the patient instructed as the bladder fills to try to void per urethram. This is repeated twice and for longer periods on the next day and the patient usually succeeds in passing a small quantity of urine. The following day the catheter can be removed, and the patient instructed to void hourly, the suprapubic dressing being changed as required. In 24 to 48 hours the patient should be dry. If difficulty is experienced the probable cause is that the bladder has been markedly atonic and has not yet recovered its muscle tone. In this case a catheter (soft rubber) should be passed and tied in, and the wound will close rapidly.

The technique described has been practised by Prof. Cabot for many years, and the clinic mortality is under 4 per cent., although the majority of the operating is done by his assistants.

Fashions and Fads in Medicine.

British Med. Jl., May 30, 1925, p. 995.

IN an address on "Fashions and Fads in Medicine" Dr. Robert Hutchison deals with an interesting psychological problem. He quotes Dr. Harris who wrote as long ago as the middle of the eighteenth century—"For some different modes and customs, sometimes perhaps better, sometimes worse, come into fashion and go out again in physics as well as dress; and the common herd of physicians too easily give credit to the promises of new leaders, till that faithful mistress experience at last shows them safer ways to Truth."

The faddist who is to succeed in making his fad a fashion must not only be a person of prominence; he must also be instant, both in season and especially out of season, in preaching his doctrine—as, indeed, most faddists by nature are. Reiteration is essential; he must proceed on the principle that "What I say three times is true," and he will infallibly obtain many disciples.

The late Dr. Mercier, said "the faddist is constitutionally incapable of weighing evidence, of suspending his judgment, or of entertaining doubts," and, as Macaulay said, he is "utterly lacking in the faculty by which a demonstrated truth is distinguished from a plausible supposition."

The man whose attention is confined to one disease is very apt to become faddy about it and to see it everywhere. His mind becomes subdued to what it works in. Tuberculosis officers, for example, are prone to find every lung "suspicious," whilst workers in V.D. clinics soon come to see everything through what Dr. Gee called "a syphilitic fog."

Faddery may be achieved through lapse of years, as a form of senility, and may be due to a thickening of the cerebral arteries. Fads are also acquired through a restless desire for novelty. A doctor may become faddy through trying to be too clever; the pseudo-scientific crank is the most dangerous of all. An ordinary "unscientific" practitioner, for instance, would never have entertained such ideas as these (quoted from a letter in a medical journal).

"Why not attribute neurasthenia to variation in the constitution of the blood, perhaps of its mineral constituents (for example, calcium) or its endocrine factors (for example, hyperthyroidism), or its vitamins, or some of its other components; or very frequently, to the presence of some toxin? Such a conception would give us the explanation of the wide distribution of the complaints in neurasthenia, and would offer a hopeful prospect of research. . . . In practice, when dealing with neurasthenia, I first suspect hidden dental sepsis, then insufficient diet (vitamins, etc.), often prescribe lime and cod-liver oil, as well as milk, egg, butter, green vegetables, fruits, and even try a polyglandular endocrine capsule in accordance with its indications."

Finally, some have faddery thrust upon them by their

teachers. Those who have the duty of training the rising generation of doctors have a great responsibility in this respect. It is easily possible for teaching to be too "up to date." It is always well, before handing the cup of knowledge to the young, to wait until the froth has settled.

Another potent generator of fashions in medicine is the advertising activity of the modern manufacturing chemist. We all know those pieces of blotting-paper which week by week drop from the skies on our desks and try to persuade us—and often succeed in doing so by a process of summation of stimuli—to prescribe for our patients a particular drug or food. The chemist goes outside his proper sphere when he tries to form fashions in pathological belief by issuing booklets or even magazines devoted to such subjects as uric acid, auto-intoxication, and endocrines and the part they play in the production of disease.

Certain factors combine to maintain the momentum of a fashion for a time. Chief amongst these must be reckoned the herd instinct. "All we like sheep have gone astray." The desire to be in the swim, not to be "out of the movement," or to be "up to date," makes many a worthy man fall in with the fashion of the moment. Further, once a treatment has become fashionable the public demand for it helps to keep it alive. There is no doubt, for example, that the public, or at least the more educated part of it, often demands from the doctor such methods of treatment as vaccines or psycho-analysis, or whatever may be the *dernier cri*, whether his better judgment approves them or no. As an anonymous writer has said:

It is easier for fat old sinners to paddle about barefoot in the dew at a Kneipp cure than to abandon at once and for ever their little darling sins of greed or indolence. There can be no doubt that every fashion does effect some cures. It does so, we know, through the power of faith and suggestion, which is the meaning of Trousseau's well known advice to a patient, "Take this while it is still curing." But by and by, when the novelty has worn off, the cures cease.

There are a few members of our profession who exploit fashions and play up to the public demand for them because it pays so to do. Many pioneers in medicine—Jenner, Semmelweis, and Lister,—have been denounced by their contemporaries as cranks. It may be said that there is, after all, "something in" most fashions, and that by summarily repudiating them we run the risk of throwing the baby away with the bath.

There is truth in this, but on the other side of the account is to be reckoned the harm fashions do in lowering us in public esteem of which I spoke at the outset of this address. It is bad enough, in all conscience, that the saying "doctors differ" should have become a proverb. But it is worse still that we should exhibit such a collective variability in our views and practice from year to year; that we should at one time attribute most human ills to uric acid, at another to auto-intoxication, to oral sepsis, to "disturbance of the endocrine balance," or to avitaminosis; that our pathological beliefs should be dominated now by "toxins," now by "reflex action," or by "vicious circles"; that to-day we should seek to cure all manner of disease by excising the ovaries, to-morrow by removing the appendix or the teeth; one year by the injection of sea-water, another by the administration of sour milk, or by the application of violet rays; that we should pin our faith for collective salvation sometimes to "team work," and at others to "early diagnosis" or "preventive medicine"; in short, that we should be as much at the mercy of the "stunts" as the yellow press, as much the slaves of catch-words as politicians, and as intellectually unstable as a popular electorate.

Fortunately many have a natural immunity to fashions and fads. They are individualists, lacking in the herd instinct; sceptical rather than dogmatic; pessimists rather than optimists, with a sense of humour and a natural instinct for truth.

The anti-fad temperament has its own drawbacks. It is possible, "to carry common sense to the point of a vice." The acquired scepticism of age also is not without danger. As Mark Rutherford warns us in *Deliverance*:

"A man must for ever keep himself open to the reception of new light. As he gets older, he will find that the tendency grows to admit nothing into his mind which does not corroborate something he has already believed, and that the new truth acquired is very limited. If he wishes to keep himself young he must use his utmost efforts to maintain his susceptibility."

On the other hand, it is possible to have too open a mind. There are some propositions ("E.R.A." for example) of which one should be able to say, "This is certainly not true, or, if it is, it has no right to be." On the whole, perhaps, we cannot do better than follow the advice of Pope:

"Be not the first by whom the new is tried,
Nor yet the last to lay the old aside."

The so-called *intelligentsia* are the most gullible of all. It would almost seem, indeed, as if everyone has a certain stock of credulity, and the more sceptical he is in everything else the more credulous is he in matters medical.

Mathews Duncan said that "there are more quacks inside the profession than outside it." If education is to help us it must be a more humanistic education.

Sanity, humour, breadth of view, and a power of criticism are, it has been said, the marks of humanism, and the result of a humanistic education is a critical, humorous spirit with a sense of proportion, not given to extremes and with some sense of historical perspective and some logical faculty.

We want, in short, more of the Hellenistic spirit, the spirit of common sense, sanity, and moderation. To quote Professor Gilbert Murray:

"If you look at a Greek statue or bas-relief, or if you read an average piece of Aristotle, you will very likely at first feel bored. Why? Because it is all so normal and truthful; so singularly free from exaggeration, paradox, violent emphasis; so destitute of those fascinating by-forms of insanity which appeal to some similar faint element of insanity in ourselves. . . . What is at the back of this sort of feeling? It is the same psychological cause that brings about the changes of fashion in art and dress; which loves 'stunts' and makes the fortunes of yellow newspapers. It is boredom or ennui. . . ."

It was this spirit of sanity which informed Greek medicine, so that, as Dr. Singer says of the physicians of the Hippocratic school:—

"They remain for the most part, patient observers of fact, sceptical of the marvellous and the unverifiable, hesitating to theorize beyond the data, yet eager always to generalize from actual experience; calm, faithful, effective servants of the sick."

Apart from such an education as this, a sense of humour is the best defence against fads and fashions, and ridicule is the weapon most adapted to their destruction. It has been remarked that there is no use in arguing with a prophet; you can only refuse to believe him. And so there is no use in arguing about a fad or a fashion; you can only laugh at it. If someone tells you, for example, that he is able to cure most diseases, from a common cold to cancer by putting his patients on the diet of King Nebuchadnezzar, you can only smile.

We tend to deal too tenderly with the crank who is allowed too much rope in our medical societies, journals, and newspapers.

He should be less the slave of the advertising chemist, less afraid to use his own judgment and common sense, and should not allow himself to be bluffed by faddists, however eminent. For, after all, the test of truth is in its practical results, and it is by the experience of the general practitioner that in the last resort all fads and fashions must be judged. Perhaps in the final analysis, however, the conclusion of the whole matter may be that both faddists and anti-faddists are required for

progress; that we must always zigzag towards our goal like a ship tacking against the wind—now going too far to the right, now to the left; that, in a word, both the "crank" and the brake are necessary for the machine.

Finally, there are fashions in doctors. It is difficult to explain what makes for success in our profession. It certainly does not seem to be a question of knowledge, nor yet of manners, nor even of character or morals.

Why does such a song as (let us say) "Yes, we have no bananas" sweep a continent, when a hundred others with equally foolish words and no less catchy an air drop still-born from the lips of the music-hall comedian? "Sir," said Dr. Johnson, "it is in vain to try to explain the inscrutable."

In some cases, of course, a doctor becomes the fashion by skilful self-advertisement, "by toying," as Sir William Osler said, "with the Delilah of the press, but many a man has become the fashion *malgré lui*, and it would be a profound mistake to suppose that all fashionable practitioners are charlatans. On the contrary, many of them have been and are men of whom any profession might be proud; for example, Asclepiades in Roman times and Tronchin in eighteenth century France."

One should not envy the fashionable doctor; rather should one wonder at him. He leads a life of slavery, even although, as a wag said, it is slavery on the guinea coast; and, circumstanced as he is, good and thorough work becomes impossible. His position, too, is always precarious. He has, it is true, his little day, but he is apt to wake up one morning to find that his worshippers have stampeded *en masse* overnight to some newer shrine of the fickle goddess Fashion.

Wounds and other Injuries in their Medico-Legal Aspect.

By SIR BERNARD SPILSBURY, M.B., B.Ch. (Oxf.).

Lancet, April 11, 1925.

Fractures of the cranial bones are distinguished from other fractures by the difficulty in many cases of estimating the degree of force that caused them, and of determining its point of application and direction. This difficulty is the result of the complex physical problem presented by the skull with its contents, and by the inadequate information in many cases as to its circumstances in which the injury was inflicted. If, for example, the victim was knocked down by a moving vehicle there may be no information as to where the vehicle hit him, as to what part of his body struck the ground, and as to whether he was dragged or crushed by the vehicle as he lay upon the ground.

Scalp injuries often give valuable information as to the point of application of the force, the nature and shape of the striking surface, and sometimes of the direction in which a blow was delivered.

Drunkenness predisposes to head injury on account of the general muscular relaxation, so that in falling the head strikes the ground with greater violence.

Pathological changes in the skull may greatly affect the formation and extension of fractures. Extreme thinness of the whole of the vertex of the skull is occasionally found at any age; the condition may be due to slight internal hydrocephalus or other pathological condition, producing increased intracranial pressure of long duration; no cause for the condition may be found. There are examples of fracture produced in very thin skulls by slight causes.

Obscure conditions of local or general thickening of the skull will have the opposite effect.

Fractures of the skull are produced by the application of force directly to the vertex or base, but the base suffers far less frequently from direct violence. The anterior fossæ are occasionally fractured by blows reaching the roof of the orbit, or nose, the middle fossa through force acting through the mouth or pharynx, and the posterior fossa may be injured by force transmitted upwards by the spine, or through the upper part of the back of the neck.

Far more frequently fractures in the base are the result of the extension of fractures produced by violence applied to the vertex, the fracture starting at the point of impact on the skull, and running downwards in a line which is fairly straight, when allowance is made for difference of strength and irregularity of shape of the base; this line corresponds with, or is parallel to, the direction of the force.

Fissured fractures often cross foramina; in one case a fracture which started at the occipital protuberance, as the result of a fall on the back of the head, ran downwards and forwards in the middle line to the foramen magnum; it continued its course in the middle line for another inch from the anterior margin of the foramen. Occasionally a fissured fracture starting near the junction of vertex and base will run through the vertex rather than downwards.

When very considerable force is applied over a small area of the vertex, a local fracture may be produced, which corresponds in form with the striking surface. Thus, the fracture produced by a penetrating stab with a sharp knife, or by the edge of a heavy sword, may exactly fit the part of the weapon which penetrated the bone. If the weapon has a thick blade and a wedge-shaped edge, as for example a hatchet, a fissured fracture may extend for some distance from each end of the cut produced by the blade.

A very severe blow with a blunt weapon, such as the head of a hammer, may produce a local depressed fracture corresponding accurately, on the outer surface of the skull, with the striking surface of the weapon. But, as in the case of bullet injuries in the skull described in the first lecture, the extent of the fracturing of the inner table is always greater, and generally of more irregular shape. Occasionally the outer table will scarcely be indented whilst the inner table is markedly depressed. Very rarely the outer table is driven inwards, and the diploë crushed, without apparent damage to the inner table.

It may happen that a depressed fracture of unusual shape will enable the weapon to be identified.

The fracture produced by a stick, or a poker, when great violence has been employed is an elongated, gutter-shaped fracture. The depressed fractures produced by weapons having a limited striking area, and many of the fissured fractures produced by these weapons, are compound, the soft tissues covering the bone being split open in the area of greatest compression. Fissured fractures of the base, laying open the sphenoidal or other sinuses, are also compound, and death may follow from meningitis.

The squamous portions of the temporal bones are generally thinner than the rest of the vertex; the diploë may be absent, and the two tables united to form a thin plate of compact bone; a similar structure is sometimes present in the posterior fossæ below the level of the lateral sinuses. Less violence is necessary to produce fractures in these areas.

When the skull is extremely thin all over, the jarring due to a slight blow or fall may produce a fracture in an area at a distance from the point of application of the force, which does not coincide in direction with the force, and which is not in the contre-coup position. The groove for the middle meningeal artery and its branches may be unusually deep and its floor may consist of very thin bone; a fracture may arise in one of these grooves and may extend along it and its branches without involving any other part of the skull. The middle meningeal artery is likely to be torn, and an extradural hæmorrhage produced as a result of such an injury.

Contre-coup injury to the brain varies in degree. Sometimes the damage is confined to a few small vessels in the pia mater; in other cases there is superficial bruising of the brain, and in more severe injuries the bruising extends deeply, and may be followed by considerable hæmorrhage into the substance of the brain. Occasionally contre-coup injury to the brain is produced by its projection against one of the fibrous

septa of the dura mater, especially the falx cerebri, the injury being found on the mesial aspect of the cerebral hemisphere on the side on which the blow has been delivered.

It occasionally happens that a person receiving a blow upon the head dies from extradural hæmorrhage due to rupture of the middle meningeal artery, without fracture of the skull, which in these cases is generally abnormally thin; the hæmorrhage is probably due to laceration of a branch of the artery, produced by sudden deformation of the skull.

Occasionally, also, a fall produces injury of the brain, sometimes in the contre-coup position, terminating fatally, without producing a fracture of the skull.

In infants injury to the brain is found only in the more severe cases, and then usually along the line of the fracture; contre-coup injuries are not found, the earliest age at which Sir Bernard saw them being at 2 years and 8 months, in a boy who was being carried across the road by a brother, when they were knocked down, but not run over, by a motor-car.

The intracranial effects and complications of fractures may appear either immediately or after a variable interval of time; occasionally they only become manifest a long time after the injury has been inflicted.

Death may be due to concussion, no gross change being found in the brain, except a little blood in the cerebro-spinal fluid of the lateral ventricles.

Injury to the arteries within the skull may give rise to remote effects. An artery may be crushed and injured by sudden pressure of the brain against the skull, or may be stretched and torn by a violent blow upon the head. The injury, if it does not result in immediate rupture of the artery, may be followed by the development of an aneurysm.

A young man, aged 22, who was said to be perfectly healthy, slipped and fell in the street, and lost consciousness for about five minutes. He recovered and went home, where he said he had ricked his head. He was never well after the accident, complaining of pain in the head; he had frequent vomiting attacks and suffered from sleeplessness; his vision also became impaired. Fourteen days after the accident he had what appeared to be a fainting attack; four days later he became unconscious immediately after he went to bed, and died three hours afterwards, having had attacks of vomiting and frequent fits during that time. On post-mortem examination he was a well-nourished, muscular man. There were no external injuries. On opening the head a saccular aneurysm was found on the left anterior cerebral artery, close to its origin; the aneurysm had ruptured into the left frontal lobe and had burst into the lateral ventricle, all the ventricles of the brain being filled with blood. There was a little meningeal hæmorrhage between the frontal lobes, and more around the pons and cerebellum. There was no brain disease; the cerebral arteries were otherwise healthy, and no disease was found in the body. There were no indications of syphilitic or tuberculous disease on microscopic examination of the wall of the aneurysm.

The Medical Witness.

By H. H. JOY, K.C.

British Med. Jl., June 27, 1925, p. 1159.

In this paper Mr. Joy gives valuable advice to medical men who are called on to give evidence in the Courts of Law. Immense responsibility attaches to the medical witness, he is almost in the position of a man who is interpreting for the court from some foreign language, and accordingly it is obviously his paramount duty to be scrupulously fair. Medical witnesses as a class prove worthy of the high confidence reposed in them. Speaking generally the ordinary witness may only give evidence as to facts, and from these facts the court draws its own conclusions; but the medical witness is permitted to give his opinion upon

the facts which he has observed, or which are submitted to him.

If the nature of the case to which a doctor is called is such as to suggest to him the possibility of ultimately being required to give evidence he should observe and record most fully everything that he finds. When he is asked to examine a patient with a view to being called as a witness, he may probably be furnished with views or theories by the party engaging his services. He should keep an open mind; he should make his examination fully first and then see to what conclusion it leads; if he cannot to his own satisfaction support the case let him say so plainly if he can, let him be careful to include in his "case notes" everything which really affects his conclusion. It may be a long time before he finds himself in the witness-box and when there he may refresh his memory from his notes; but he may also be asked to show them to the counsel for the other side; obviously if something to which his evidence he has attached importance is not to be found in the note made at the time he lays himself open to criticism.

But the doctor should not make a habit of using these "notes" too liberally—any "refreshing" should be done before entering the witness-box; a witness is not likely to create such a good impression on the court if he gives the appearance of not knowing the facts.

If in the progress of the case facts new to you come out which cause you to modify or even alter your views you will naturally have to act accordingly if you go into the witness-box; but in such a case take care to let counsel know how the new or altered facts affect your view.

The simpler the language of the expert the greater is his effect upon the court. In a case before a judge and jury a doctor stated in his evidence that "on examining the prosecutor he found him suffering from a severe contusion of the integuments under the left orbit, with great extravasation of blood and ecchymosis in the surrounding cellular tissue, which was in a tumefied state; there was also considerable abrasion of the cuticle." The judge: "I suppose you mean that he had a black eye?" The doctor: "Yes." The judge: "Then why not say so?"

When you are being cross-examined keep your temper, for the gentle art of cross-examination embraces infinite styles and varieties, and some must be enough to try the temper of a saint. Listen carefully to the question; beware of double questions, and if you do not understand what is put to you, say so and get it made intelligible to you before you answer. When being cross-examined do not merely answer Yes or No to medical questions; such questions are put to you presumably—at least they should be—because the witnesses for the other side are going to give them as their views, so explain your reason for not accepting what was put to you. Avoid arguing with the cross-examiner; if there is anything you consider really objectionable in a question or in the way of putting it appeal to the judge—you are entitled to be protected from unfair treatment—but, of course, don't do that unless it is really bad. If an extract from a book is cited to you in cross-examination, remember that you are fully entitled to see the passage and its context before you give your answer; it not infrequently happens that when investigated with its context the point which was intended to be made against you wholly collapses; or the quotation may be from a standard work now out of date; or from an old edition of a work, in the recent edition of which a different view is given; or it may happen (indeed, has) that the passage was one cited by the writer of the book for the purpose of contradicting it or exposing its fallacy. But when you know that you are giving a view which is really contrary to the usually accepted view, be ready to fortify it by your special experience or other good ground.

If, in cross-examination you find yourself being cross-examined on a subject on which you have no particular knowledge, do not try to answer; say you cannot

deal with that. The court will esteem you the more highly for not pretending to have knowledge that you do not possess. Avoid making any sort of attack upon the other medical witnesses or giving the impression that you consider yourself far superior.

It is often a matter of amazement to find how completely doctors differ, or appear to differ, from each other in the evidence that they give about a case. Perhaps the most influential reason is that of unconscious partisanship. The ideal medical witness should be on guard against this from the beginning.

In the witness-box, being cross-examined, he feels that it is "up to" him to justify the confidence placed in him by his side; it is human nature to want to "play up" accordingly and almost unconsciously he adds a little or omits a little.

Sometimes the cause for this difference of views is of quite another kind; there may be a real division in the profession upon the point under discussion—some think this, some that. Here is a chance for you to help counsel.

If you make a deduction from certain stated facts, be quite sure there is no flaw in your deduction. No less a person than a very learned judge whose face was an exact counterpart of that of George III on the coins, on one occasion when counsel was inviting a jury to infer a certain consequence from the likeness of two people to each other, interrupted him saying, "Don't dwell too long on that. It has been said I am the son of His late Majesty George III because of my likeness to him; all I can say upon that subject is this: George III was never in Scotland, and my mother was never out of it; so if you can make me out to be his son, do. Now go on." Counsel, in a stage whisper for the jury to hear, to his neighbour: "But they might have met at the border!"

When you are being cross-examined be on the lookout for questions which assume that you have said something which you have not said, or that something has been proved which has not been proved, and for questions to which you cannot properly answer Yes or No—for example, "Have you given up beating your wife?" Considerable latitude is allowed to the cross-examiner, but he has no right to put unfair questions or make inaccurate statements, and the witness is fully entitled to point out the inaccuracy, and, in extreme cases—to appeal to the judge if he thinks the question unfair. When you feel that you have scored a point and floored the cross-examiner with your answer, be content—do not try to kick him as well.

Your function is to assist the court to arrive at what you believe to be a correct conclusion upon the medical question in the case, and you will do that most effectively by not showing any resentment at cross-examination, or trying to score off counsel personally, but by answering the questions courteously and simply; and, as opportunity arises, giving the reason why you cannot accept this or that suggestion that is put to you.

For a witness in court there is no privilege recognised by the law as regards facts which the doctor may have observed or with which he has become acquainted in his capacity as medical attendant.

In many cases it must be very unpleasant for a doctor to find himself asked to disclose information about his patients; but he can do no more than appeal to the judge to know whether he is bound to answer. The judge will say Yes; but the doctor will feel that he has done what he can to preserve the confidential relationship between himself and his patient. If he persisted in refusing to answer he would be liable to be committed for contempt of court. Incidentally, what a witness says in the witness-box is privileged, which means that it cannot be made the subject of an action for slander.

Stovarsol.

In the treatment of amœbiasis, emetine still to-day holds the first and most honoured place. On the other hand—as Dr. Manson-Bahr has noted in a recent review

of the literature—it is becoming increasingly evident that, whilst emetine is the most rapid line of clinical cure for amebiasis, it is doubtful whether any infection of a patient with *Entamoeba histolytica* in the colon can be absolutely eradicated by emetine therapy; far more often what happens is that the patient is clinically cured, but the parasites are still there, and relapses are all too likely. In other words, whilst emetine therapy is the first line of treatment, other lines of treatment should be investigated—either to replace or to supplement emetine therapy.

In such supplementary or primary therapy, arsenic is a drug of considerable importance, both from its protozoocidal and tonic actions; and in recent literature "Stovarsol," a purified organic product prepared by Messrs. May & Baker, London, has received much attention. In a recent article in the *Paris Medical*, Dr. E. Marchoux, of l'Institut Pasteur, Paris, speaks of the drug in very high terms. He quotes cases of amebic dysentery, one treated by Delancé and apparently cured; a very severe case cured by de Chauliac; three cases, two of which were cured, but one relapsed, treated by Legar and Nogue in the Senegal; Fontanel as having cured three obstinate cases of long standing; Rubenthaler and Jausion as having cured five cases; and other authors as claiming that not only is the amebiasis clinically cured, but that subsequent examinations of the stools have failed to shew the specific parasite.

Marchoux's series now reported consisted of 59 persons suffering from infection with *E. histolytica*, treated between March 1923 and July 1924. Of these 59 cases, 3 had acute amebic dysentery at the time, the others were carriers, in many instances with a history of previous or chronic amebic dysentery, and of relapsing dysentery. All were treated with "Stovarsol," given orally, for six weeks.

Subsidiary measures consisted merely in forbidding smoking and alcohol, and in the avoidance of butter—which is stated by Pavlov to inhibit gastric digestion. For patients with achlorhydria, a mixture of hydrochloric and phosphoric acids was prescribed. The dose of "Stovarsol" given in the majority of cases was one of the 4-grain tablets, taken with food, twice a day, representing a total of about 0.5 gm. per day; in some of the more intractable cases as much as 1 gm. was given per day.

In 2 of the cases "Stovarsol" was unsuccessful; in the first no improvement occurred on small doses, the patient left Paris and further observation was impossible; in the second the condition at first improved rapidly, but a relapse occurred each time the treatment was stopped, and the patient also left Paris. In addition to the cases of amebiasis, 21 patients infected with *Giardia (Lamblia) intestinalis* were treated with Stovarsol.

In general, Dr. Marchoux reports that under this treatment the condition of the patients improves rapidly, their discomfort disappears, their diarrhoea or dysentery abates, their general condition improves; "cysts diminish in number and disappear; soon afterwards the most rigid investigation fails to reveal a single one." Above all the mental and psychic condition of the patient improves to a remarkable degree. He sums up his conclusions in the following terms:—

- (1) Stovarsol cures amebic dysentery.
- (2) It destroys *Blastocystis hominis*—(an organism which he clearly regards as pathogenic).
- (3) It cures certain cases of lambliaosis, and benefits all.
- (4) It stops indigestion, because the arsenic in this form promotes the action of the digestive diastases and prevents putrefaction of the undigested waste products.
- (5) It cures diarrhoea, toxic neuralgias (such as lumbago, sciatica, intercostal neuralgia, etc.), and lessens the severity of expulsive gingivitis.

(It will be seen that the claims made for "Stovarsol" are of a very high order. The literature is at present being so flooded with reports on new remedies for amebic dysentery, however, that a most critical atti-

tude is necessary. At the Calcutta School of Tropical Medicine, "Stovarsol" has been on clinical trial for a year, and it is hoped shortly to collect the results for publication. It may immediately be stated that, as Professor Marchoux has found—in common with other workers—many cases of amebic dysentery and of tropical diarrhoea clear up at once on Stovarsol treatment, and improve enormously in general condition and mental outlook. Secondly, the treatment is one very easily administered, it avoids the painful experience of emetine injections. Thirdly, however, caution is necessary and the avoidance of too prolonged courses of treatment, owing to the possibility of ocular trouble. Finally, with regard to the question as to whether systematic treatment with Stovarsol will eradicate the infection with *E. histolytica* and cure the carrier state, it is as yet too early to make any definite statement; a large number of patients should be kept under prolonged observation after treatment, and their stools frequently and systematically examined. In our opinion, in brief, Professor Marchoux's statement is almost too optimistic. "A good wine needs no bush," but the question of the eradication of an infection with *E. histolytica* is one which demands prolonged and most careful study. That patients do recover from the carrier state and that infection with *E. histolytica* can be not merely clinically cured, but absolutely eradicated, is certain; the final cure probably rests, not with any drug, but with the patient's powers of resistance; that arsenic may be of considerable value in raising this resistance is very probable. Clinically, however, Stovarsol is a drug which may be recommended with considerable confidence to the medical profession.)

Reviews.

AN INDEX OF TREATMENT.—By various writers. Edited by R. Hutchison, M.D., F.R.C.P., and J. Sherrin, C.B.E., F.R.C.S. 9th Edition. Bristol: John Wright & Sons, Ltd., 1925. Pp. 1035. Price, 42s. net.

THIS well-known book has gone through nine editions, two of which were reprinted, in 18 years. The last edition was published in November 1921. A number of the articles have been rewritten entirely and all of them have been revised; a few, those dealing with infective endocarditis, spinal analgesia and surgical tuberculosis have been added. Most important alterations have been made in the articles on certain subjects, for example in the articles on asthma, diabetes, syphilis and certain tropical diseases.

The contributors number nearly a hundred; each has written on the subject or subjects on which his opinion is authoritative. The list includes the names of practically all the leading physicians and those of many of the best known surgeons. The tropical diseases are dealt with by authorities on these subjects.

The physician in the tropics is liable to judge the value of a book on general medical treatment by the way in which the tropical diseases, with which he himself is familiar, are dealt with; his confidence in this book will not be shaken, if he judges it in these lines. All recent advances in the treatment of tropical diseases have been included. In the section on malaria we particularly welcome the opening paragraph "quinine is the only drug that can be said to be a certain cure, but the method of administering the dose, and the compound used, vary in individual cases." This fact cannot be emphasised too much. There would appear to be a huge conspiracy to contradict this statement if one is to judge by the number of "specifics" for the disease, "guaranteed to contain absolutely no quinine," which are put on the market.

The book is nicely balanced throughout. No subject appears to be neglected and on no subject has too much

and jungles, which accounts for the observed fact that the general health of the people is better in time of scarcity, and is not seriously affected until actual famine prevails.

It has been truly observed that the majority of mankind dig their graves with their teeth, and the process may be studied from day to day amongst the general population of any country. The tendency to excessive eating is caused partly by sheer gluttony inasmuch as the satisfaction of appetite gives pleasure, but it is also partly due to an attempt by nature to ensure that a sufficiency of all the necessary component parts of a balanced diet are included.

The absence of balance leads to excess. Excess in eating is only possible when an ample food supply is available but when such is the case, it is the usual practice of the majority. The results are disturbances of digestion and nutrition, which predispose to all sorts of bowel diseases, such as cholera, dysentery and diarrhoea, and which are the direct foundation of many other diseases of metabolism, of which diabetes and cirrhosis of the liver are two only too frequent examples.

A sparse regimen is the golden rule of health, wherefore the poor man has a great advantage in health over his richer neighbour.

The available knowledge as to the scientific balancing of diet is as yet incomplete, but it is at least sufficient to guide us far beyond the present practice in eating.

The accustomed diet, be it based upon rice, or *ata*, or upon meat is, in almost all cases, defective and excessive.

The food is first deprived of its best and most nutritious parts when the rice is husked and polished or the *ata* is ground fine and white, or the potatoes are peeled, and then it is spoiled by cooking which slowly destroys the vital properties, at present known as vitamins, which are essential to good health.

Man is the only animal that cooks his food and he is a fool for his pains. The less food is cooked, the better it is. The longer it is cooked, the more deficient it becomes in vital properties.

The combination of cooking with the removal of the valuable and nutritious skins and inner husks of vegetables, fruits and grain, leads to a deficiency in diet of the vital elements which create and maintain life, and farther leads to excess in eating in the effort to make up for these deficiencies.

Further, the accustomed diets of most races, be they based upon rice, upon *ata* or upon meat are all one sided. The habit is to eat too often of one thing, such as rice, and to eat too much of it and so to clog the body with a quantity of starch which it cannot digest. A balanced diet must contain fresh fruits and vegetables in ample quantity, and should, if possible, include good clean milk, and these things should not be cooked or boiled for more than a few minutes and would be better not cooked at all.

The quantity of any one article of diet of a staple nature such as rice, *ata* or meat should be kept small, and balanced by the addition of fresh fruits, vegetables, and milk, so that the total diet will contain a balanced combination of the essential proteids, carbohydrates, fats, and mineral salts, together with an ample supply of the essential vital elements.

Lop-sided, badly balanced, diets deficient in vital elements are in general use and are the direct cause of many diseases such as beri-beri, epidemic dropsy, scurvy, etc., and are the most potent cause of general ill-health and debility and the most common predisposing cause of all other diseases. Much has been written about immunity and how to create protection against disease and how to cure it by disinfectants, drugs, and inoculations. But the last word in the story of health is this,—that a healthy body is the best defence against disease, and the golden rule of health is to eat little and wisely."

Chief Diseases.—There is a remarkable difference in the distribution of disease in urban and rural areas. The infectious diseases, the spread of which depends upon overcrowding, density of population and the con-

sequent facilities for infection, are consistently more prevalent in the towns: whereas fevers, of which malaria is the chief, are more prevalent in the rural areas, where the facilities for anopheline breeding are greater and where the economic condition of the people is frequently not so good. The large towns are hotbeds of consumption, and this disease, together with pneumonia and influenza, causes the death rate from respiratory diseases to be many times greater in towns than in rural areas. Similarly, cholera and plague are more prevalent in the towns than in the villages.

Cholera.—The provincial death rate from cholera rose from 0.2 in 1923 to 2.2 in 1924. The districts of Champaran and Gaya recorded the highest rural cholera death rates, and Katihar, Darbhanga and Revelganj amongst the towns. Special preventive measures were taken, and a special staff employed, as usual, in connection with the *Rath Jatra* festival at Puri and at Sonapur fair. The use of chlorinated lime for disinfecting wells has been generally adopted by the local bodies; the epidemic cadre of 10 assistant surgeons was maintained throughout the year, and a special additional staff of 20 epidemic doctors employed for about six months during the epidemic. A special epidemic reserve of 200 vaccinators was also entertained from April to September for cholera and other epidemic duty. To some extent anti-cholera vaccine was used, of which 4,805 doses were issued. In general the epidemic is fought by treatment of patients with kaolin and permanganate, and disinfection with bleaching powder.

Cholera has always been a scourge in Bihar and Orissa. In previous epidemics the total mortality in the province has reached such enormous figures as from 150,000 to 200,000 deaths; in 1924 the epidemic was fought step by step, preventive measures were taken beforehand, weekly epidemic reports were utilised to indicate centres which should be taken in hand before mortality rose, and towards the end of September the epidemic abated. The total cholera mortality for the year was only 77,480; and the figures shew what can be done by vigorous and anticipatory measures.

Small-pox incidence also rose during the year, and it was severe in the towns of Bhagalpur, Chakradhapur and Bettiah. The death rate from fevers rose from 17.6 in 1923 to 19.3 in 1924. Colonel Ross is of opinion that relapsing fever occurs in the province, although its existence has not yet been demonstrated. Malaria, although a cause of vast amount of sickness, he considers is not an important cause of the mortality in the province. Plague was unimportant during the year.

Propaganda work was steadily pushed during the year, and much excellent spade work is being done in this connection. The five school medical officers visited 246 schools during the year, examined 11,392 pupils, and delivered 1,417 lectures. Village sanitation is at present reported to be a negligible quantity; "village unions steadfastly refuse to tax themselves and their revenues are too small to enable them to carry out any serviceable sanitary programme. In the majority of cases a large portion of their revenues is wasted on the payment of a clerk and a peon who have practically no work to do." The results are profoundly discouraging.

The number of food samples found to be adulterated was very high; 48 per cent. of samples of *ghee*, 94 per cent. of *ata* and flour samples, and 47 per cent. of milk samples were found to be adulterated; what this means in the deterioration of public health is best left to the imagination. A Food Adulteration Act exists, but in the hands of municipalities and district boards it is largely a dead letter.

Public Health Policy.—Finally, Colonel Ross has some interesting remarks to make on the necessity for a public health policy in the provinces in India. "The issue is simple," he writes. "Public health is directly concerned with the health of the community and indirectly with its prosperity, contentment and happiness, which are all in part the outcome and in part the accompaniment of good health and working capacity. Public health

includes within its scope both the prevention and the cure of disease, and all the measures that appertain thereto. Curative medicine deals with the individual. Preventive medicine deals with the community, and is a greater application of the principles of medical science to greater numbers. It is, in short, the result of a process of evolution in the application of medical knowledge and is recent in origin, and as yet undeveloped, insufficiently appreciated, and inadequately applied.

In the application of scientific knowledge to the uses and the benefit of the people there are natural subdivisions of activity: in curative medicine, the individual doctor treats the individual patient: in preventive medicine, the individual element is subordinated, a specialised staff is employed by the state or by local bodies to advise the administration, and to supervise the measures adopted with regard to the betterment of the public health: in the determination of policy, the application of legislation, and the carrying out of approved measures, the administration consummates the process. It is by the perfect co-ordination and development of these three activities that public health may come into its kingdom and that lasting good may be done.

In the control of public health it is first essential that there should be a definite policy, and such policy should be founded upon exact scientific knowledge, interpreted and applied to the benefit of the community.

The second essential is careful and complete organisation with the purpose of getting the best and most rapid results at the least cost. In the execution of preventive measures, good organisation is the key to success and such organisation must be created and maintained before any effective work can be done. It is quite useless and very wasteful to undertake *ex-tempore* preventive measures, and create a temporary staff for preventive work when an epidemic is raging and widespread.

The essence of prevention lies in anticipation. Unless the preventive organisation is in being and ready to deal at once with the first outbreak of epidemic disease, it is better to realise the hopelessness and futility of preventive work and to concentrate chiefly on measures of relief.

The struggle between health and disease is a state of war and the preventive organisation is the army which defends the health of the people. In war itself it is an axiom that a people must be prepared always beforehand with a highly trained army. The analogy is perfect. The preventive army must also and always be prepared beforehand, and be ready to engage in the fight without delay. Delay is fatal, and the time factor is all important. It is for this reason that all nations and peoples maintain a fighting army for the protection of the nation, and it is for this reason that a preventive army must be maintained and kept ready to safeguard the health of the people.

The third essential is obviously to provide the necessary funds. No army can be maintained without cost and no army should be maintained unless there is some advantage to the community in doing so. The uses and advantage of a preventive army are obvious. The people can be protected from decimation by the ravages of epidemic diseases and the saving of lives and the prevention of disease build up a stronger and more virile population with greater working and productive capacity, which is better able to live and enjoy life, and which is economically more prosperous. The gain is a double one, both in health and in wealth, and will more than suffice to pay the price of protection from disease.

Existing legislation is defective and inadequate in many ways and new legislation is very necessary if any real progress is to be made. Such legislation as is needed must be more simple, more concise, more comprehensive, and must give a strong and definite lead, with a view to requiring and directing a definite advance in public health standards and administration. The only question at issue is:—How far is it wise to go? It is admittedly useless to legislate too far in advance of public opinion, but on the other hand it is equally certain

that legislation must either go in advance of public opinion and give it a lead—wisely and without undue pressure—or it must and will lag behind, in which case retrogression will take the place of progress, because of the arrest in the advance of public opinion, and the inertia engendered by the failure to use its influence and stimulate its growth.

It is, I believe, essential to tackle the problems of public health more firmly and with a greater grasp, and to put forward a bigger and a braver policy of legislation and control. The principles of public health are essentially the doctrines of socialism. The greatest good of the greatest number is the basis of both.

The principles and practice of public health betterment have not yet been absorbed nor incorporated in the public opinion and public policy of India. The creation of public opinion and a communal conscience in public health matters is as yet lacking but must necessarily precede any real progress in the betterment of public health. At present therefore it rests with Government to direct and to control all measures dealing with public health and the initiative in all such matters must continue to rest with the administration until public opinion has been formed and has gained sufficient strength to direct its own policy."

ANNUAL STATISTICAL RETURN ON VACCINATION IN BIHAR AND ORISSA FOR THE YEAR 1924-25. BY LT.-COL. W. C. ROSS, M.B., Ch.B., D.P.H., I.M.S., DIRECTOR OF PUBLIC HEALTH, BIHAR AND ORISSA. PATNA: SUPDT., GOVT. PRINTING, BIHAR AND ORISSA. PRICE, 9 ANNAS.

The three assistant directors of public health remained in charge of their circles during the year; the inspecting staff consisted of 20 district inspectors and 69 sub-inspectors, and 1,121 licensed and 222 paid vaccinators were employed in the province during the year. The total number of operations performed was 1,044,282—an increase on the previous year; of which 990,571 were primary vaccinations. In general the proportion of protected children in the province is equal to some 346 per mille, although the figure for municipal areas, 433 per mille, is better. These figures, however, comments Colonel Ross, are unsatisfactory, and they shew that far more than half the total primary vaccinations are carried out on children more than one year old. This is due to the opposition of parents to having children vaccinated in early infancy, and he considers that the Vaccination Act should be amended, and the age for compulsory vaccination raised from six months to one year.

Small-pox was prevalent during the year, and mortality from it rose from 3,893 deaths in the previous year to 8,345 deaths in 1924-25. Colonel Ross predicts that this is but a beginning; "there is a serious risk that the disease may rage in epidemic form during the next two years unless strong action is taken to enforce the vaccination of the population." He considers that small-pox cannot be dealt with satisfactorily in the province unless compulsory vaccination is extended to the rural as well as municipal areas and the whole province included; the age for compulsory vaccination should be raised to one year; vaccination should be free; and supervision and inspection should be delegated to district boards and municipalities and their health officers.

The work of the Vaccine Depôt at Namkum was very satisfactory during the year, and large reserves of lymph are in hand. The number of doses issued was 2,657,321, whilst 2,924,131 doses remained in hand at the end of the year. The average net cost per vaccination works out at only 0.37 pies, if receipts to the Depôt be taken into account. The cold storage plant, which had given constant trouble in previous years, was duplicated, and is now in very satisfactory order. The use of adult animals for obtaining lymph has been abandoned, as there is nothing in its favour.

Further work is in hand with a view to rejuvenating and improving the seed vaccine.

The entire cost of the department for the year was Rs. 1,56,973, which works out at approximately 2 annas 6 pies per successful vaccination all over the province.

REPORT OF THE CHEMICAL EXAMINER TO GOVERNMENT, PUNJAB, FOR THE YEAR 1924.
BY CAPT. D. R. THOMAS, I.M.S., CHEMICAL EXAMINER TO GOVERNMENT, PUNJAB.
LAHORE: SUPDT., GOVT. PRINTING PUNJAB, 1925. PRICE, 8 ANNAS.

DURING the year 1,569 cases comprising 5,133 articles were examined. There were 537 human poisoning cases, including 4 of criminal abortion; 44 of cattle poisoning, 609 stain cases, of which 345 were cases of murder or hurt by violence. Of the fatal human cases 34 appeared to be due to causes other than poisoning, whilst poison was detected in 81 per cent. of the remaining suspected cases. The poisons employed were very varied, but arsenic, opium, dhatura and mercury were those most commonly employed. In the animal poisoning cases, poison was detected in 46 per cent. Two hundred and sixty-one cases, comprising 566 articles, were sent to the Imperial Serologist, Calcutta. During the year 1,117 articles were examined for purity and quality, as against 533 articles in the previous year. These included water samples, soil samples, cocaine, various drugs, and articles in connection with bomb cases. Of 218 samples of cocaine 58 were found to be adulterated with drugs such as antifebrin.

Captain Thomas' report includes a very interesting list of cases of medico-legal interest from which we have abstracted the following:—

A woman died in Amritsar under suspicious circumstances and the body was burning when the police interfered and had the viscera sent for examination. Arsenic was found.

The body of a female infant aged about two weeks was found in a railway carriage at Rawalpindi one night. The body was very emaciated and the infant might have died of starvation. Arsenic was detected in the viscera.

An old man aged about 60 years died at Delhi where he was being treated for dysentery by some Unani medicines. The wife of the deceased was not of a very good character and doubt arose. His viscera on examination contained arsenic.

Two cases were received from Delhi at various times, one of an old man aged 65 years suffering from asthma and another of a male about 40 years with signs of double pneumonia. Opium was found in both cases. No doubt this drug was taken by the deceased without the knowledge that it was contra-indicated in such complaints.

A body of a female aged 20 years was found buried in a field near Karnal. It was in an advanced state of decomposition and no marks of violence could be made out. Opium was found in the viscera.

The body of a male child aged 2½ days, tied in white latha cloth was dug up from a grave in Jhang District. It was buried in soft sandy soil and was well preserved. The analysis of the organs showed mercury and traces of opium.

During the cold weather a young man in good health went to witness a circus in a village in Patiala State. He was seen drinking during the afternoon. His body was found next day about a mile from the village. Alcohol was detected in all the organs. It was a very cold night and he died from exposure. This is a typical example of many cases that have occurred during the year.

A patient in Chunian, Lahore District, was given by mistake a dose of pure carbolic acid instead of his mixture by the attendant. He immediately showed signs of collapse and died in 45 minutes. The mucous membrane of the whole œsophagus and stomach was

white in colour. Carbolic acid was detected in the stomach and the urine.

Most cases of criminal abortion are carried out by mechanical means with the result that sepsis sets in and the woman or girl dies of septicæmia. One case was received from Lyallpur where arsenic was plugged into the vagina of a young female aged 16 years. It was rapidly absorbed and the usual symptoms of acute arsenical poisoning developed and arsenic was detected in the stomach and liver.

BENGAL PUBLIC HEALTH DEPARTMENT.
DR. SUR'S REPORT ON KALA-AZAR WORK IN HOOGHLY DISTRICT FOR THE YEAR 1924.

DURING the year two kala-azar treatment centres were run, one at Hooghly and the other at Singur. These centres were started in June 1923, with the object of making observations and arrangements in regard to the following matters:—

- (i) to find out the actual intensity of kala-azar in the Hooghly district, as many assert that cases detected in survey work never approach the actual figures, but that it is only when a treatment centre is opened that the real figures are found;
- (ii) to find out the best field method of diagnosis, as many treatment centres are being opened now-a-days and it has become necessary to make a rapid diagnosis;
- (iii) to find out whether a treatment centre can check an epidemic and eradicate it from a locality;
- (iv) to make a treatment centre a training ground for medical practitioners; and
- (v) to give relief to the patients.

Seasonal variation.—The table shows that the number of kala-azar cases rose in May, June and July and then fell; whereas the number of malaria cases began to rise in August, reached its highest in November and then commenced to fall.

Sex distribution of Kala-azar cases.—The number of male patients in the centre was higher than that of females both in kala-azar and malaria, but the proportion of males to females in kala-azar was somewhat higher than in malaria.

Age distribution.—This shows that nearly 72 per cent. of the cases are under 20 years.

Kala-azar Index.—The population of the Hooghly thana, including the Hooghly-Chinsura Municipality is 37,043. No part of this thana was more than three miles from the centre. It might therefore be expected that most cases in the thana would attend the centre. Dr. Sur knows for certain that very few, not more than a dozen, were treated by other practitioners. There being 242 cases from the Hooghly thana in 1924 with a history of a month to a year's duration, the case incidence in that particular year cannot be more than 6.5 per mille, if not less, as some cases cropped up in the year before. The population of Magra thana, including the Bansbaria Municipality is 21,981. The number of cases during the year being 156, the kala-azar incidence of the area is not more than 7.1 per mille, which nearly approximates to that of Hooghly.

I stated in my previous report that in the Chanditala thana of the Hooghly district, the case incidence was calculated after survey to be about 6 per mille.

Diagnosis of Kala-azar.—The diagnosis of kala-azar may be made by—

- (i) finding the Leishman Donovan body—
 - (a) from the spleen and liver;
 - (b) from the peripheral blood, either by staining a film or by culture.
- (ii) serum reaction—aldehyde test.
- (iii) quinine elimination.
- (iv) taking a careful clinical history.

(i) The first method is considered impracticable under the circumstances.

(ii) Aldehyde test:—In the Hooghly kala-azar centre chronic malaria cases also come for treatment suspecting themselves to be suffering from kala-azar.

Altogether 673 aldehyde tests were done. The reaction was put under definite categories, either positive or negative, with no alternative between the two. The positive category included those which turned white with jellification within 24 hours, whilst the negative category included those with jellification but transparency and those with no jellification. All the cases tested were random selections. Of the 673 cases, 305 gave positive reactions and 368 negative reactions. But by clinical history and by adopting a course of treatment it was subsequently found that of these 305 positive reactions 270 proved to be kala-azar. This means that 90 per cent. of the cases positive by the aldehyde test are kala-azar and 10 per cent. are non-kala-azar. Of the 368 negative cases, 154 turned out to be kala-azar.

The non-kala-azar aldehyde positive cases were cured by quinine and remained so for at least six months. In three of them in which the aldehyde test was positive within 5 minutes spleen punctures were performed for corroboration. No Leishman-Donovan bodies were found in the film after long search. The aldehyde reaction, therefore, though useful adjuvant in diagnosis, is not infallible.

(iii) and (iv) Elimination by quinine and clinical history are therefore of more value in diagnosis in a rural centre. In the Hooghly centre, the authors administer quinine in 15 gr. doses daily for a week with two intravenous injections of 10 grs. of bihydrochloride during that period. In 95 per cent. of the malaria cases one injection of 10 grs. with 45 grs. of quinine by mouth for three days and in the remaining five per cent. two bi-weekly (? twice weekly) injections with 90 grs. in a week were found sufficient to stop the fever.

Treatment.—Treatment was carried on with sodium antimony tartarate in two per cent. solution. Additional treatment was also given to improve the condition of the blood.

On the average, five injections were necessary to stop the fever and 21 injections to cure the patient. Not more than one per cent. of the total cases were known to have relapsed within 6 months. Altogether, 19,313 antimony injections were given in the centre. The average daily attendance on injection days during the year was about 150.

Treatment as a method of prevention.—The names of the villages with the number of cases against them that came under treatment month by month in 1924 have been tabulated. The object was to find out whether kala-azar could ultimately be eradicated from a village. For instance, from Rajhat village of Polba thana, 9 cases were admitted in September 1923, 2 cases in October, nil in November, 1 in December 1923, 2 in January, 2 in February, 4 in March, 2 in April, nil in May, 3 in June, 1 in July, 1 in August, 1 in September, 8 in October, 4 in November and nil in December, 1924. Similar examples of other villages might be mentioned. Hence it is apparent that the mere opening of a treatment centre is not all that can be desired for the prevention.

[Comment.—Dr. Sur begins his report by summarising the object of the survey, but does not finish by summarising his conclusions. One, however, concludes that he is of the opinion that a survey will give an accurate idea of the number of cases of kala-azar that exists in any area, and that nothing can be gained in this direction by opening a treatment centre. The figures that he gives certainly seem to prove this case and one is compelled to admit that his treatment centre does not seem to have attracted a larger number of patients than were previously known to exist in this area. His experience is contrary to that of many others.

A great deal depends on his statement that, "I know for certain that very few, not more than a dozen, were treated by other practitioners." This statement suggests a very intimate knowledge of the movements of 37,043 persons.

Dr. Sur presumably considers quinine elimination and clinical history the most valuable means of making a diagnosis in the field. He may be right, but his arguments are not conclusive. He accepts quinine elimination as the crucial test on which he judges the aldehyde test and finds it far short of perfect. If on the other hand he had accepted the aldehyde test as the last word in the matter he would have found the quinine elimination test defective. He found that 33 of the 303 cases that gave a positive aldehyde reaction were not kala-azar. The evidence for this statement is that these 33 out of the 303 patients were apparently cured by quinine and remained cured for 6 months. He does not say whether he traced each one of these patients or concluded from their non-attendance that they were cured. It is a well-known fact that kala-azar patients occasionally show temporary improvement on quinine and that even without treatment of any kind they recover a degree of health for long periods. In three cases spleen puncture revealed no Leishmania infection but again he does not state on how many cases this operation was performed. A single spleen puncture does not confirm the diagnosis in much more than 90 per cent. of cases of kala-azar so that if he did 30 spleen punctures on cases of kala-azar one would not be surprised at his finding three of them that did not show parasites.

The aldehyde test is a non-specific one. As far as Bengal is concerned it can be claimed that more than 99 per cent. of cases giving a strongly positive aldehyde reaction are cases of kala-azar, and that less than 1 per cent. of uncomplicated chronic malaria cases give a definitely positive reaction; this has been demonstrated in non-kala-azar areas; so that for all practical purposes a positive reaction can be accepted as diagnostic of kala-azar. In the early stages of kala-azar the aldehyde reaction is not positive, so that a negative result cannot be accepted as final, and it is here that the quinine elimination test is of value.

As regards treatment, we cannot accept the statement that on an average the temperature disappeared after five injections; our own experience with 70 cases who were subsequently cured was that on an average the temperature became finally normal after the 15th injection. It is certainly true that patients begin to feel distinctly better after a very few injections, and this may have been accepted as evidence of the absence of fever. An average of 21 injections is very low, and we are surprised that in the face of the experience of others and in the absence of laboratory proof of cure Dr. Sur cared to risk giving such a short course of injections. The statement that "not more than 1 per cent. of the total cases were known to have relapsed within six months" may simply mean that he had no information as to the fate of the other 99 per cent. With the very inadequate course of treatment that the majority of the cases would have received the relapse rate must have been at least 20 per cent. This suggests that Dr. Sur did not enjoy such an intimate knowledge of the people of the neighbourhood as his earlier remarks might have led one to suppose.

No deaths are reported.

L. E. N.]

Correspondence.

FEMALE MEDICAL AID IN RURAL AREAS.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—Is not the health of the women of India an important factor in the health of their children and of the race in general? If so, is it not the duty of every one—and especially of medical men—to care for them and to institute such arrangements as will ensure to the women of India proper medical attention, especially during such times as in confinement and in the puerperium?

In the towns and cities of India there are women's hospitals, lady doctors, trained midwives and trained *dhais*, but in the rural areas of India, comprising some 90 per cent. of the population, a trained *dhai* is hardly to be obtained within a ten-mile radius of any village. Yet the medical profession in India and our leaders of national thought and our wealthy merchants take but little note of such a situation.

The villagers in the rural areas are utterly ignorant; they know nothing of the preservation of health in either sex; they do not know what measures to take for a pregnant woman, nor where to seek advice and care in her confinement—supposing it to be even a normal one,—nor whom to consult after her delivery. The women of India will not be attended by doctors of the male sex. Hence they resort to quacks, and often spend large sums of money on devil appeasement by the *ojha*, or witch doctor. The results are terrible.

Amongst literate classes in the rural villages of Bengal it is customary to send women for their confinements to the towns where trained female medical aid is available. Amongst the illiterate and poorer classes those who have no means depend solely upon the mercy of Him who created the female. Still-born births, miscarriages, abortions, puerperal eclampsia,—all are termed works of a ghost or devil, and much money is expended in the satisfaction of the *ojha* or doctor of the ghost.

Can not trained *dhais* at least be supplied to every District Board dispensary in the rural areas of the country?—Yours, etc.,

S. P. NAG, V.L.M.S.

DASPUR, HOOGHLY DIST.,
26th October 1925.

"PULSE DIAGNOSIS."

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—It is the custom among some of the Ayurvedic and Unani physicians of India to establish diagnosis by the pulse; on feeling the pulse of the patient, noting his posture and movements, noting his more obvious symptoms, such practitioners profess ability to reach an immediate diagnosis before the patient has yet begun to tell his history. Hence when a practitioner of the orthodox or Western system is called in, his inability to establish an immediate "pulse diagnosis" tends to disbelief in his professional ability. In fact many rural patients will refuse to disclose the history of their complaints on the ground that diagnosis is the business of the doctor, and not of the patient.

In rural practice, therefore, the trained medical practitioner has either to acquire the mysteries of "pulse diagnosis," or lose his practice.—Yours, etc.,

B. I. KEWALRAM, L.C.P. & S.

DAHARTI, SIND,
16th July 1925.

THE TEMPERATURE OF RECTAL AND INTRAVENOUS SALINE INJECTIONS IN CHOLERA.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—I would feel much obliged if, through the medium of the *Indian Medical Gazette*, medical officers with experience of intravenous saline transfusion, could be induced to publish their views regarding the temperatures at which fluids should be introduced into veins. Authors of books seem to be somewhat at variance on this subject and even Sir Leonard Rogers has, I think, of late altered his views. As the best results can only be obtained by a combination of ideas born of experience, it would be in the interests of the profession to work on some settled and definite basis. The following are a few quotations from books:—

1. Colonel O'Meara's "Medical Guide for India," 2nd edition, p. 197—(Cholera treatment, revised by Sir Leonard Rogers).

Rectal temperature below 99°F. Flask temperature about 102°F.

Rectal temperature above 99°F. or over. Flask temperature about 100°F.

Rectal temperature over 100°F. Flask temperature about 99°F.

Rectal temperature over 102°F. Solution should not be warmed.

2. "Medical Annual" 1925, p. 86—(D. N. Banerjee). If the rectal temperature is 98°F. the saline should be at body temperature, and if the rectal temperature is higher the saline should be as many degrees below 98°F. as the rectal temperature is higher, and vice-versa. Sir Leonard Rogers commenting on this, says that in Calcutta where cholera cases occur mostly in the hot weather, the saline should rarely require to be warmed, while if the rectal temperature is 102°F. or 103°F., it may have to be cooled.

3. Manson-Bahr, 8th edition, p. 353—"The fluid in the containing bottle should be at a temperature of about 100°F. if the rectal temperature is below 99°F. If the latter is above 100°F., as there is risk from hyperpyrexia, the injection should be given at a temperature between 80° and 90°F."

4. Stitt, 4th edition, p. 236.—"If the temperature by rectum is about normal or slightly below, the temperature of the fluid should be 102° to 104°F."

5. Taylor, 12th edition, p. 176.—"The temperature of the fluid varies with the rectal temperature. If this is below 99°F. the saline should never be injected at above 98°F. for fear of producing hyperpyrexia. If the rectal temperature is 100°F. or over, the fluid should be given between 80° and 90°F."

From what I saw in Mesopotamia in 1916 and on the North West Frontier in 1919 and from my recent experience of over 200 intravenous saline injections I am led to believe that hyperpyrexia is not altogether dependent on the temperature of the fluid injected. Personally I have had no occasion to use fluid above 100°F. Fluid at this temperature I use when the rectal temperature is in the neighbourhood of 97°F. If the rectal temperature is 98°—99°F. the fluid injected is of about the same temperature. I have had rises of temperature under both conditions, but nothing alarming. A temperature of 104° or 105°F. can be promptly reduced by rectal iced saline. Apart from the suggestion that pyrexia after intravenous injections is due to causes other than the temperature of the fluids injected alone, idiosyncrasy also I think plays an important part. Quite recently I had three cases of rigor followed by a rise of temperature to about 103°F. after an intravenous injection of gr. ½ of iodine in 10 c.c. of sterile distilled water at about 86°F. This happened on four occasions consecutively in the same man, while others who had the same dose under similar conditions and at the same time showed no reaction.

While on this subject I would point out that the phrase "room-temperature" is misleading, as we have great extremes of temperatures in different parts of India and in the same locality during different seasons of the year. To work on a settled basis it would be advisable to avoid using this term and to state the temperature definitely in degrees.

One other point deserves notice. In the latest edition of Manson-Bahr I find that potassium chloride which has for some time now been omitted from hypertonic saline, is still advocated. I would be glad to have the views of your readers on this point also.—Yours, etc.,

V. J. LOPEZ,
Medical Officer.

ALIPURAM JAIL, BELLARY,
13th July 1925.

THE PROVOCATIVE DIAGNOSIS OF MALARIA.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—I see in the *Indian Medical Gazette* for May 1925, an article by K. V. Raju on quinine plus alkalies in the treatment of malaria. In paragraph 7 of his conclusions he remarks that "if there is any drug which could be administered to drive parasites into the peripheral circulation, it would be of benefit to know of it."

There are two such methods of driving parasites from the spleen into the peripheral circulation.

(1) Adrenalin hydrochloride: 1/1000, 5 minims by hypodermic injection. This method was shown to me by Dr. Adamson, R.M.O., Kapurthala in 1922. A patient sent up as a case of suspected phthisis with a chronic temperature and suspicious apices of the lungs was given such an injection. Within an hour he had a severe rigor and parasites were found in the blood, which before was negative. This method is harmless.

(2) In an address and demonstration by Sir James Barr, C.B.E., F.R.C.P., F.R.S.E., delivered at the South West London Postgraduate Medical Association on October 16th 1924, he states:—"Dr. Abrams believed that the spleen was the chief manufactory of antibodies, hence in all infectious diseases he carried out what he termed splenic sterilisation. He first concussed between the third and fourth dorsal spines to dilate the vessels and get the germs out of the dark corners. He next concussed the seventh cervical and second dorsal spines to dilate the spleen and gather in the germs. He then, after two hours, concussed the second lumbar spine which contracts the spleen, and drives the germs and antibodies into the blood stream and so furthers the bactericidal action.

In cases of malaria he gave a large dose of quinine after concussion of the second lumbar spine.—Yours, etc.,

W. W. JEUDWINE,
LIEUT.-COL., I.M.S.

SIMLA,
22nd June 1925.

TREATMENT OF VARICOSE VEINS OF THE LEG BY AN OCCLUSION METHOD.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—I have read with interest the above treatment advocated by Captain D. R. Kehar in your issue for last June. To me it appears a dangerous procedure from the possibility of embolus formation, unless the vein be "milked" before the ligatures are applied. I would like to learn further particulars of the technique and of its results through the medium of your journal or direct from Captain Kehar.—Yours, etc.,

A. BAYLEY-DE CASTRO,
Junior Medical Officer, Port Blair.

ANDAMAN ISLANDS,
6th July 1925.

THUMB IMPRESSIONS AFTER DEATH.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—Is it possible for a medical jurist to tell, by looking at a thumb impression, whether it was taken during life or after death?

The question has arisen in connection with the following case:—A man who had no near relative living with him came under my treatment. As his condition became worse, some of his neighbours requested him to make a will leaving his property to a local temple. He refused and died a few hours later. It is now stated that a scheme was hatched among these people to have a will drawn up and to affix to it the thumb impression of the dead man. The scheme fell through because one of the persons concerned disagreed with it.

The question, however, may be of medico-legal interest.—Yours, etc.,

D. BHARADWAJA, L.R.C.P.,
L.R.C.S. (Edin.), L.R.F.P. & S. (Glas.).

GANGOH, SAHARANPUR DIST.,
26th October 1925.

A CASE FOR DIAGNOSIS.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—Can any of your readers enlighten me as to the possible diagnosis in the following case?

A female child, 4 years of age, was under my treatment for chronic malaria for some months. She appeared to be in good health after treatment for more than a month, the splenic enlargement having disappeared and her condition being good after a course of quinine and arsenic mixture.

On the morning of the 21st of July last, however, I was called in to see the child for fever and diarrhoea, which had started quite suddenly the previous night. The patient had had 3 or 4 soft stools during the night and the same number the next morning, the stools being small, yellowish or greenish in colour with some mucus. Her temperature on examination was 103°F., pulse very rapid and soft, respiration hurried. I prescribed medicine and gave instructions as to diet.

I was called again about midday the same day and found the child in a dying condition. She was reported to have passed two tarry stools an hour previously and to have become restless. I found her pulseless and cyanosed and she died shortly afterwards.

I am unable to account for the sudden melaena and the rapidly fatal issue.—Yours, etc.,

KHAGENDRA NATH CHATTERJEE, M.B.

CHINSURA,
18th August 1925.

(Note.—Possibly a fulminating infection with Shiga's bacillus, but the details given are insufficient to say.—EDITOR, *Indian Medical Gazette*.)

Service Notes.

APPOINTMENTS AND TRANSFERS.

In exercise of the power conferred by article 3 of the Statutes of the State Medical Faculty of Bengal, the Governor in Council is pleased to appoint Major-General R. Heard, C.I.E., M.D., R.H.S., I.M.S., to be President of the governing body of said Faculty, vice Colonel R. P. Wilson, C.I.E., V.H.S., F.R.C.S., I.M.S., resigned.

Lieutenant-Colonel J. W. D. Megaw, M.B., I.M.S., to be Honorary Surgeon on His Excellency the Viceroy and Governor-General's personal staff, vice Colonel R. P. Wilson, C.I.E., F.R.C.S., I.M.S., tenure expired.

Lieutenant-Colonel J. Cunningham, I.M.S., is appointed Director, Pasteur Institute of India, Kasauli, with effect from the 6th November 1925.

Lieutenant-Colonel W. R. Batyë, D.S.O., I.M.S., an Agency Surgeon, on return from leave, is posted, as Administrative Medical Officer in Central India and Residency Surgeon, Indore, with effect from the 12th November 1925.

Major W. O. Walker, M.B., F.R.C.S.E., I.M.S., is appointed as Civil Surgeon of Serampore, with effect from the forenoon of the 4th November 1925.

The services of Major J. L. Sen, M.C., I.M.S., are placed permanently at the disposal of the Government of Assam.

Captain B. G. Mallya, I.M.S., Superintendent, Alipore Central Jail, is appointed temporarily to act as Superintendent of the Juvenile Jail, Alipore, in addition to his own duties, during the absence, on leave, of Lieutenant A. P. Lopez, I.M.D., or until further orders.

Captain H. G. Alexander, F.R.C.S., I.M.S., Second Resident Surgeon, Presidency General Hospital, Calcutta, is appointed as First Resident Surgeon at that Hospital, with effect from the 1st November 1925, vice Major Hingston, I.M.S.

Captain S. A. McSwiney, M.B., F.R.C.S.I., I.M.S., Resident Medical Officer, Medical College Hospitals, is appointed as Second Resident Surgeon of the Presidency General Hospital, Calcutta, with effect from the 1st November 1925, vice Captain H. G. Alexander, I.M.S.

Captain H. E. Murray, M.D., I.M.S., is appointed to be Resident Medical Officer, Medical College Hospitals,

Calcutta, with effect from the forenoon of the 31st October 1925.

The services of Captain G. R. McRobert, M.D., M.R.C.P., I.M.S., are placed temporarily at the disposal of the Government of Burma.

LEAVE.

Lieutenant-Colonel F. A. F. Barnardo, C.I.E., C.B.E., M.D., F.R.C.S.E., I.M.S., Principal and Professor of Medicine, Medical College, Calcutta, and First Physician, College Hospitals, is granted leave for eight months, with effect from the 3rd September 1925.

Lieutenant-Colonel A. Leventon, I.M.S., Superintendent, Campbell Medical School and Hospital, Scaldah, was allowed leave for two years one month and eighteen days from 11th March 1923 to 28th April 1925.

Lieutenant-Colonel J. R. J. Tyrrell, I.M.S., an Agency Surgeon, is granted leave on average pay for 8 months under the Fundamental Rules, with effect from the 12th November 1925.

Major H. H. King, I.M.S., an officer of the Medical Research Department, is granted leave on average pay for two months, with effect from the 6th November 1925.

RETIREMENTS.

Lieutenant-Colonel J. W. Illius, F.R.C.S.E., I.M.S., (under the Premature Retirement Rules), with effect from the 4th September 1925.

Major A. G. Coullie, F.R.C.S.E., 10th September 1925.

PROMOTIONS.

Captain to be Major.

J. W. Van. Reenan, M.B., F.R.C.S.E., I.M.S. Dated 31st July 1925.

Captain (now Major) J. Scott, D.S.O., O.B.E., M.B., I.M.S., to be acting Major from 19th July 1918 to 26th March 1920, whilst employed with the Egyptian Expeditionary Force.

NOTES.

FACULTY OF TROPICAL MEDICINE, BENGAL.

The following candidates passed the examination held on the 5th October 1925 and subsequent days at the Calcutta School of Tropical Medicine, for the certificate at the end of the short term course:—

1. Dr. Serajuddin Ahmed.
2. " Lakshmi Kanta Ally.
3. " Kumude Behari Banerji.
4. " S. J. Bellgard.
5. " Santi Prosad Chandra.
6. " Chrinjilal.
7. " Mannoo Lal Dave.
8. " Tapidas Maganlal Doctor.
9. " Ram Lal Madan.
10. " Suresh Chandra Mukherji.
11. " Shyma Charan Pal.
12. " Satyendra Prosad Sen Gupta.

LONDON MEDICAL EXHIBITION, CENTRAL HALL, WESTMINSTER, LONDON.

October 5th to 9th, 1925.

BURROUGHS, WELLCOME & CO.'S EXHIBIT.

The exhibit of Burroughs, Wellcome & Co. provided striking examples of progress in scientific pharmacy. A careful study of the products shown, both old and new, showed how thoroughly the needs of physicians are met and how efficiently this organisation keeps in touch with and renders practical the latest developments of progressive therapeutics.

Amongst the more recent additions were "Hypoloid" Bismuth Metal which places the potent spirillicidal properties of bismuth in isotonic glucose solution at the disposal of the physician. Another product of interest to the syphilologist is "Kharsulphan" for subcutaneous or intramuscular injection which provides a further simplification of arsenobenzol therapy.

"Iodicin" a product containing a high percentage of iodine in organic combination, in a pleasant, palatable chocolate base, is a very suitable means of administering iodine to children. Intensive iodine treatment, so successful in the hands of modern physicians, is, facilitated by "Tabloid" "Iodicin" capsules, each of which secures the administration of one grain of iodine in organic combination. "Ethidol" which contains 20 per cent. of iodine, is an allied product for use by injection into tuberculous abscess cavities, or for inunction in neuritis, rheumatoid arthritis, sciatica, etc. It possesses great localised penetrative power.

Interest was added to the exhibit by the display of "Wellcome" Brand vaccines, sera, tuberculins and diagnostic products, prepared at the Wellcome Physiological Research Laboratories and distributed by Burroughs, Wellcome & Co. Laboratory technique is provided for by the production of "Soloid" Micro-Stains, "Soloid" Nutrient Agar-agar, Opacity Tubes and numerous reagents of interest to the bacteriologist.

Production of pure chemicals and galenicals on an extensive scale is one of the major activities of the firm and the striking display of sodium salicylate of dazzling whiteness attracted attention to this typical "Wellcome" Brand product.

Every medical man, be he specialist or general practitioner, found much of value and interest to him at this :

OTALGAN.

An interesting product prepared by Messrs. H. R. Napp, 3 & 4, Clements Inn, Kingsway, London, W. C. 2, is "Otagan." In the treatment of otitis media, inflammation of the tympanic membrane and tympanum, and aural complications arising from coryza and other infectious complaints, the practice of using hot poultices, whilst relieving pain, does nothing to decrease tension and may increase the tendency towards mastoiditis. "Otagan" is stated to be phenyl-dimethyl pyrazolon, a 5 per cent. solution in anhydrous glycerine. It can be used without any previous preparation of the meatus, as the solution is stated to be completely anhydrous and the components freely soluble, whilst it should not be previously warmed. With the patient's head in the horizontal position, sufficient "Otagan" is dropped in to fill the auditory meatus, and no subsequent poultice or fomentation should be applied.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

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The Editors of the *Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

Original Articles.

THE INFLUENCE OF FOOD ON MORAL AND PHYSICAL DEVELOPMENT IN BRITISH INDIA.*

By V. B. GREEN-ARMYTAGE, M.D., M.R.C.P.,
MAJOR, I.M.S.,

Second Professor of Gynecology and Obstetrics,
Medical College, Calcutta.

LADIES AND GENTLEMEN,

I am going to attack the sacred edifice of the modern mother's castle, and what I am going to say to you is of such great importance to yourselves, your children, and those for whom you do social work that I trust you will forgive me if I am outspoken.

Alexander Pope two hundred years ago wrote that the proper study of mankind is man; but I think if he lived to-day he would have written "the proper study of mankind is woman"; for surely it is a wonderful example of the privileged illogicality of women, and a symbol of their sub-conscious sadistic cynicism that they are willing to see a vast amount of ill-health without raising a finger to alleviate it, or attempting to discover its origin.

You remember that during the great War between 1914 and 1918 the manhood of the nation was conscripted. It was then found that one-third of this manhood was what we describe as C. 3, i.e., diseased or defective. What was the cause of this? Was it our sanitation or our housing? No, for it is a well known maxim that man can thrive under any circumstances provided his food supply is good.

Was it our women who had failed to follow the dictates and laws of nature? Yes.

Was it indirectly due to ignorance and laziness on the part of our doctors or social workers? Yes.

Was it due to silence on the part of our pulpits and press? Yes, for not until it was too late was it realised that the era of this C. 3 population exactly coincided with the genesis of patent milk foods, bottled fruits and tinned meats.

The War broke out in 1914; the canned food era began seriously in 1894; but the War has at least taught us that the white man's curse is the predatory capitalist who preys on your credulity, ignorance and innocence, and broadcasts lies and flatulent nonsense on tins and hoardings which every mother accepts as gospel truth.

Verily a universal psycho-analysis is necessary for a state of mind that can be hypnotised by a tin or a hoarding, for such a state of mind

* An address given to the Central Welfare Clinic workers.

infers an inferiority complex, "a spare-the-trouble and spoil-the-child complex" which time and the War have proved utterly unworthy.

Someone once wrote "the hand that rocks the cradle rules the world". Do you think that he would write that to-day if he saw a bottle of X or Y or Z patent food in the cradle? No. Would he not prefer to write "the hand that rocks the cradle upsets the world and the baby"?

For cannot you all realise that despite the immense advances in medicine and surgery in the treatment and prevention of acute diseases, there is the undoubted fact that tuberculosis, cancer, appendicitis, pyorrhœa, enlarged tonsils, adenoids, flat foot, visceroptosis, constipation and glandular diseases are more common to-day than they were thirty years ago?

Cannot you see that there is a direct relationship between modern feeding and modern disease? The era of preserved food must go. We must get back to the common sense of our forefathers. You and I did not have patent food and canned meats as children, yet two-thirds of modern children do.

What of them and their posterity? We are their sponsors. Can you expect a normal mentality in a depleted glandular system? Can you expect other than Bolshevism, crime and sex complexes when instead of *mens sana in corpore sano* you have *mens insana in corpore malo*?

How many of you know anything of the feeding of a baby or child? If the least upset occurs, some fond friend or nurse or doctor comes along and suggests some patent food, and because Mrs. Jones' baby thrived temporarily and looks a bonny baby, you adopt the same treatment.

But you do not see that child at one, at two, at six, at puberty and early married life, as I do. I have records of thousands of such. You do not hear or see the anxiety and shame and pitiable distress.

You do not see the infant dying of acute diarrhœa. You do not see the child flat-footed, flat-chested, anæmic and pot-bellied. You do not see the case of delayed puberty nor the young wife who is unable to conceive; you do not hear the agony of the girl wife in labour, whose muscles and bones have not developed properly due to past defects in feeding; such agony is Nature's revenge on you as a mother and on your daughter through you. *Sunt lacrimæ rerum.* Do you realise that the enormous numbers of operations for tonsils, adenoids and appendicitis are the result of food faults and that some surgeons would starve if mothers fed their children correctly?

Do you know that six hundred of every thousand children born in Calcutta die within the first year of life, and of the four hundred

who survive one hundred are C. 3 at two, at six, at twelve and at twenty years. Do you grasp the fact that 50 per cent. of poor school children are foul-breathed, bad-toothed, big-tongued, flat-chested, flat-footed and pot-bellied? What is the reason? Their food—as I shall presently be able to prove to you.

Is it to be wondered at that the modern child is vicious, lacks enterprise, energy, and *vis a tergo* and is easily led astray when he grows up? Moreover when they do grow up they will be less virile and less capable of producing healthy children. Surely this is a state of affairs worth rectifying.

I shall not say a word against the masters and pastors of these children, for you all know how admirable they are in many instances, but what can they do when the soil is poor and the flesh is weak—however willing the spirit?

It is no good shutting your eyes and blinking facts. Doctors, clergy, press and social workers must combine to get at the home and the mothers. Practical propaganda and knowledge based on sure scientific data which has its proof in results, is the surest way of rectifying the moral and physical downfall which threatens Greater Britain.

We must teach the mother how to feed *before* the baby is born, and what to eat so that she may be able to nurse it or at least direct its feeding correctly—in order to ensure that the child obtains from infancy to adolescence the necessary vitamins and salts of iron, calcium, phosphorus, iodine, etc., from its food. Only by this means shall we see the future generation physically and morally growing up with those traits of character upon which we Britishers have hitherto prided ourselves.

The truth and nothing but the truth lies in our food supplies and depends upon substances we call vitamins, and in order to make manifest what I have been saying I append a digest of the subject. There will be “doubting Thomases” among you. If there are, may I remind them that every one of these symptoms and effects have been actually demonstrated and proved during recent years by experiment on men and animals? For instance, compare the Bengali, his physique and diet with that of the Punjabi; compare the Anglo-Indian with the pure European. For those of you who had relatives who were fighting or were made prisoners during the recent War, think of the diseases of the prisoners’ camps, of the diseases peculiar to the trenches; of the deficiency diseases of Mesopotamia; of the diseases and ill-health of modern France. What are we doing in British India to-day? Nothing! and yet all over the rest of the civilized world the press, doctors, clergy and social workers are waking up to these facts. It is astound-

ing that here in India with all its thousands of illustrations of diseases, our doctors, our press, our pulpits are either ignorant or silent as regards the vast importance of food and its bearing on one hundred problems both social and political in India to-day.

Perhaps you are not aware that two thousand years ago to-day Brutus killed Julius Cæsar for the sake of progress; would that so it might be also that I could this day kill the patent food and canned meat exploiter, who are the white man’s curse of the twentieth century, for then like Brutus I might paraphrase and say “it is not that I love India less, but truth more”.

Finally remember—“Where there is no vision the people perish”.

Conclusions.

“Vitamines are A, B, and C. Without vitamins we morally and physically slowly perish”.

“‘Ignorance in action’ exactly describes the scandalous state of dietetics in Greater Britain to-day. This ‘ignorance in action’ produces a C. 3 population, morally and physically degenerate.”

The average typical diet of the poor or ignorant to-day is made up of:—

Dried, patent or twice boiled milk, white-meat flour [Shakespeare’s “distressful (white-meat) bread”], milled polished rice, with twice-cooked meat or curry, and stale, or long-cooked vegetables.

Margarine, commercial butter or *ghee*, vegetable oil, lard, pork fat, sausages, or meat soup. A pudding of cornflour, sago, tapioca, pearl barley, arrowroot, macaroni, made with or without a custard or egg powder. Pastry or cake.

Tinned, so-called jam or marmalade, treacle, sugar or sweets, occasionally tinned meat or bottled fruit, biscuits, bananas, beetroot; washed down with tea, coffee, cocoa, or beer.

*Do you realise that not one single item of the above diet contains any vitamin?**

Can you expect other than moral and physical degeneracy?

Do you wonder that conditions such as rickets, anæmia, osteomalacia, pyorrhœa, constipation, enlarged tonsils, adenoids, cancer, tuberculosis, difficult labour, rheumatism, appendicitis, glandular diseases in childhood, puberty and adolescence, etc., etc., are more common to-day than previously?

Vitamins are absolutely necessary for the proper function-acting of all the vital glands and processes of the body, together with the assimilation of calcium, iodine, iron, magnesium, sodium, potassium and phosphorus from our food.

* This statement would not be accepted by most workers on vitamins as being strictly accurate; several of these articles contain appreciable quantities of vitamins.—Editor, I. M. G.

SHORTAGE OF VITAMINE A, CAUSES :—

- (1) Cessation of growth, or wasting.
- (2) Reduced resistance to infectious diseases, especially lung or gland infections.
- (3) Failure in the development of bone and teeth.
- (4) Anæmia.
- (5) Corneal affections.

SHORTAGE OF VITAMINE B, CAUSES :—

- (1) Loss of appetite or depraved appetite.
- (2) Gastro-intestinal derangements, indigestion, constipation, colitis and worms.
- (3) Loss of weight, weakness and lack of vigour.
- (4) Headache, anæmia and unhealthy skin.
- (5) Nervous and cardio-vascular depression.
- (6) Oedema.

SHORTAGE OF VITAMINE C, CAUSES :—

- (1) Sallowiness.
- (2) Loss of energy.
- (3) Fleeting pains in the limbs and joints in adults.
- (4) Growing pains in children.

Since such are the symptoms of shortage, they may be guarded against by partaking of those substances that Nature has provided, and against these substances—according to their degree of vitamins—I am placing 1, 2, or 3 plus marks:—

VITAMINE A.

Mother's milk	+++
Home-made butter	++
Fresh egg yolk	++
Green vegetables	++
Underdone meat	++
Fresh (fat) fish, e.g., <i>hilsa</i>	++
Cheese	++
Sweetbread, liver, kidney, heart	++
Beef and mutton fat	++
Fresh cow's or goat's milk	+++
Cod-liver oil	+++
Fresh game, snipe, pigeon, duck	++
Fish roe	++
Oysters	++
Shrimps	++

VITAMINE B.

Whole-meal or brown bread	++
Peas, beans, dhal, <i>brinjal</i> , ladies' fingers, etc.	++
Fresh egg yolk	++
Liver, heart, kidney	++
Sweetbread, brain	++
Nuts and fresh fruits	++
Yeast—(remember yeast extract, which we call marmite)	++
Porridge	++
Maize	++
<i>Chapati</i>	++
Corn cobs	++

VITAMINE C.

Fresh fruit—as oranges, grapes, lemon, tomato, etc.	+++
Raw green vegetables; especially, salads, celery, radish, onions	+++
Cooked green vegetables; especially spinach, cabbage, potato, turnips, etc. (if they are cooked not more than 15 minutes and no alkali is added)	++

THE BABY CINEMA IN PUBLIC HEALTH PROPAGANDA.

By A. W. TUKE, F.R.C.S.I.,

LIEUT.-COLONEL, I.M.S.,

MAY I call the attention of your readers, especially of those who are interested in rural hygiene, to the value of the excellent little Cinema Projector made by Pathé Freres of France, Ltd. It is quite likely that it is well known to many as it has been some months on the market, but are its educational possibilities recognised? Armed with this little instrument which only weighs a few pounds and a dozen or two films which could be carried in your pocket and only cost 3s. 6d. each, anyone with the help of the printed instructions could go into a village, be it in India or in England, and give an entertainment that could not fail to be of interest and amusement to old and young. No electric installation is necessary as the current is produced by merely turning a handle. To town-dwellers surrounded by a plentiful supply of cinema halls no doubt such a small picture might fail to appeal, but to those whose lot in life is cast in villages an occasional "Baby Ciné" show might be very welcome indeed. But it is not primarily with the object of amusing the rural population that I am concerned. It should be used for health education and for education in other subjects such as agriculture and natural history. Should you wish you can obtain a special camera and make your own films. Projector, camera and all you will need will not cost you £30 and the projector alone under £7 (in England). At

present no films bearing on the subject of health are obtainable for the Baby Cinema but I hope it will be possible to produce them in the near future. At any rate films suitable for use in India would be better if produced in India. Heaven knows there is plenty of scope there for health propaganda work in the East! To those who are possessed of a camera I would suggest such films as the following:—

1. Showing specimens of bad housing in towns and villages.
 2. Showing defective water supply.
 3. Showing milk production and sale.
 4. Showing how flies contaminate food.
 5. Showing the life history of the mosquito.
 6. Showing the life history of any common insects that carry disease.
 7. Showing how tuberculosis is spread.
 8. Showing a group of consumptives.
 9. Showing a group of syphilitics.
 10. Showing a group of children who have rickety deformities.
 11. Showing the results of chronic malaria, enlarged spleens, wasting, etc.
 12. Showing a model crèche for the children of working mothers.
 13. Showing a model food shop.
 14. Showing a model dairy.
 15. Showing a butcher's shop as it generally is and as it should be.
 16. Showing children doing physical drill, playing outdoor games, country dances, etc.
 17. Showing a group of blind persons.
- Around such films as these could be woven valuable little half-hour lectures which might help towards making life healthier in India.

More than half-an-hour performance I would not give. The active ingredient should be given with plenty of vehicle of an attractive taste.

A NEW METHOD OF ISOLATING AND CULTIVATING VIBRIOS FROM FÆCES, ESPECIALLY SUITED FOR THE DETECTION OF VIBRIO-CARRIERS IN FIELD WORK.

By J. W. TOMB, O.B.E., M.D., D.P.H.,

Chief Sanitary Officer, Asansol Mines Board of Health,
and

G. C. MAITRA,

CAPTAIN, I.M.S.,

Research Worker, School of Tropical Medicine and Hygiene, Calcutta.

(Mining Association Endowment.)

IN the course of the investigation into the bacteriology and epidemiology of cholera, which we are at present conducting in the Asansol Mining Settlement, we found that during the hot dry months of the year (February to June)—which also constitute the epidemic season in that area—vibrios were extremely numerous in the smaller village ground tanks much used by the inhabitants for bathing; the number of vibrios found in such tanks being approximately proportionate to the number of people using the tanks and inversely proportionate to the volume of water they contained. In very large "clean" tanks vibrios could only be found in close proximity to their bathing *ghats*.

From these observations we were driven to the conclusion that the vibrios found in the water of ground tanks were derived from human fæces and this conclusion was proved to be correct, for when several selected tanks were "closed" by one of us (under the *Regulations for the Prevention and Control of Cholera in the Asansol Mining Settlement*) and all bathing and washing of soiled clothing in the tanks prohibited, vibrios were found to have disappeared completely from the tanks after the lapse of ten to twelve days. On the order being withdrawn and bathing and washing being resumed, in all cases vibrios immediately reappeared. We therefore inferred that a considerable number of "carriers" of vibrios existed in the community, but when we attempted by ordinary laboratory methods of cultivation to demonstrate the presence of vibrios in the stools of those frequenting the tanks in question the results were so conflicting that we were forced to conclude, not that carriers were fewer in number than the experiment of prohibiting bathing and washing in the tanks referred to had led us to believe, but that the ordinary laboratory methods for isolating vibrios from stools were fallacious. We therefore set ourselves to discover a more reliable method of isolating vibrios from stools.

As our investigations had shown that ground tanks—particularly when polluted with a certain

degree of organic matter—were specially favourable to the growth and multiplication of vibrios, we decided to imitate Nature and to manufacture artificial ground tanks for our purpose. With this end in view we procured from the local bazar a number of earthenware *gumlas* (bowls), each of about one foot in diameter and nine inches in depth. These we lined thickly with tank mud and then filled them two-thirds full with stored raw tank water proved by frequent examination to be free from vibrios by intensive methods of cultivation. The water in these mud-lined *gumlas* was then again tested daily for over fourteen days to demonstrate the continued absence of vibrios. Into these artificial "ground tanks" small quantities of fæces were inseminated and the bowls left at room temperature (75° to 90° F.) in dry lockers duly protected from dust and direct currents of air.

In positive cases a pellicle formation on the surface of the bowls was often visible to the naked eye within three or four days, and on subculture of the surface layer on bile-salt-agar plates a rich growth of vibrios was demonstrable. Vibrios, although appearing in these artificial tanks about the second or third day after inoculation of fæces, did not however survive for more than three or four days in contrast to those in ground tanks which we had found to survive for as long as from ten to twelve days.

Since the chemical analysis of the water in ground tanks with high vibronic content usually revealed a higher percentage of organic matter than that in tanks not so heavily infested, we endeavoured to make up for the presumed deficiency of organic matter in our artificial tanks by the addition to them of a few c.c's. of a 1 per cent. solution of peptone.

The result of this was a great improvement, as vibrios when thus cultivated were found to multiply in the *gumlas* for a considerably longer period than was previously the case. Small quantities of sterilised urine were also substituted experimentally for salt-peptone with very satisfactory results.

About this juncture an article appeared in the *Indian Medical Gazette* for July 1925, p. 301, by Lieutenant-Colonel A. B. Fry, I.M.S., mentioning that the entrance of tidal water into fresh-water ground tanks in the deltaic areas in Bengal had long been observed to increase the virulence of cholera epidemics in those regions.

Acting on the hypothesis that the increased epidemic virulence thus observed was in all probability due either to the longer survival or the increased growth of vibrios in salt water, we added 1 per cent. salt to the water in the *gumlas* described above.

In this medium we found to our great satisfaction that vibrios grew readily and multiplied freely, but as earthenware *gumlas* were obviously unsuitable for general adoption in laboratories, we set out to discover which of the constituents of our artificial tanks could be eliminated without

loss of efficiency. After much experiment it became apparent that mud was unnecessary, that ordinary enamelled bowls could be substituted for the earthenware *gumlas*, and sterilised tank water for raw tank water.

Our artificial tanks therefore now consist of ordinary enamelled bowls of about 500 c.c. capacity containing 250 c.c. of sterilised tank water with 1 per cent. common salt; one c.c. of a 1 per cent. sterile peptone solution being added immediately before inoculating the medium with faeces.

For the collection and conveyance of stools to the laboratory we have adopted the following procedure:—

- Large test tubes (6 in. \times 1 in.) containing 10 to 15 c.c. of 1 per cent. salt solution are inseminated by means of a dry piece of wood or twig from a tree with a small quantity of solid faeces or cholera stool as the case may be. To the salt solution in these test tubes we have found that the addition of peptone is unnecessary, since 1 per cent. salt solution has proved to be a selective medium in which vibrios temporarily multiply whilst other faecal organisms are either held in check or tend to die out.

This method of collecting and transporting stools in the investigation of cholera in field work has proved of inestimable value, since the delay unavoidable in the conveyance of stools from distant villages to the laboratory proves in practice by this method to be an actual advantage, whereas by previously recognised methods such delay was almost certainly fatal to success.

On the arrival of the test tubes in the laboratory, or after 2 to 6 hours at room temperature, about six large loopfuls of the surface liquid in the tubes are inseminated into the enamelled bowls. The inoculated bowls are then left in a locker at room temperature, protected from dust and air. A few loopfuls of the surface layer of these bowls are tested daily for the presence or absence of vibrios by intensive methods of cultivation through peptone medium and subsequent plating out on bile-salt agar. Should vibrios not appear in the bowls within one week they are rejected. In positive cases vibrios as a rule appear within two to three days, and when abundant persist in the bowls for from two to four weeks.

This method of isolating vibrios from faeces and cholera stools has proved a great advance over all other existing methods, not only on account of its greatly increased accuracy but also on account of its cheapness; enamelled bowls, salt solution and a little peptone being all the materials required.

A NOTE ON THE INCIDENCE OF NEURO-SYPHILIS AMONG COLOURED RACES.

By O. A. R. BERKELEY HILL, M.D. (Oxon.),
MAJOR, I.M.S.,

Superintendent, Ranchi European Mental Hospital.

Of the more important diseases few have received of late so much attention as general

paresis. In October 1924, the International Bureau of Public Health in Paris made general paresis a special subject for discussion. Early in 1925 Dr. Kolb of Erlangen published in the *Zeitschrift für die gesamte Neurologie und Psychiatrie* an appeal for comparative statistics of general paresis on an international basis. Later, in the same journal, Dr. Kolb published the first instalment of the data he had received in reply to his enquiry. Although the information which I have been able to obtain has nothing like the same scientific value as that collected by Dr. Kolb, it may, all the same, be found to be of some little interest.

In 1922, at the request of Professor Emil Kræpelin, I issued a questionnaire composed by myself in the hope that the information it would elicit might be of some help in solving the riddle of general paresis, especially in respect to its incidence among coloured races. The questionnaire was as follows:—

(1) The incidence of G. P. I. among..... and.....

(2) The incidence of tabes among..... and.....

(3) Whether there are any records of data of any sort pointing to a recent increase in the incidence of either of these two diseases.

(It would appear from the information supplied to me by Dr. Dudgeon, the Medical Superintendent of the Khanka Asylum in Egypt that there has been such an increase of insanity among the native population.)

(4) If.....display a greater immunity to other diseases besides G. P. I. than is the case among Europeans.

(5) If affections of the skin and bones are more (or less) common in syphilis among..... than among Europeans.

(6) If syphilis is more (or less) prone to affect the brain and meninges among..... than among Europeans.

(7) If eye-symptoms are more (or less) common in cases of tabes dorsalis in.....than among Europeans.

(N.B.—In the blank spaces was inserted the name of the coloured people of the country to which the questionnaire was sent.)

Through the courtesy of the late Director-General of the Indian Medical Service, Sir William R. Edwards, K.C.I.E., C.B., C.M.G., M.D., F.R.C.S.E., my questionnaire was circulated to all Army Divisional Headquarters as well as to the Medical Department of each province in India. With the exception of the United Provinces, (whose Government would not consent to any attention being paid to my questionnaire), all the provinces and divisional headquarters throughout India treated my appeal with great consideration. The following is a summary of the information received from both civil and military departments to whom my questionnaire was sent:—

1. Dr. G. C. Ramsay, Labac Central Hospital, Cachar, Assam, states:—

Cachar is highly malarious. Syphilitic lesions are less severe than are in England. He has never seen cases of parasyphilitic lesions there. He seems to think that those born locally who survive malaria in youth and contract syphilis later in life are to some degree immunised against the toxins of the *Spirochaeta pallidum*. He further observes that the absence of G. P. I. and tabes dorsalis in malarious Assam and the "Vienna" treatment of these diseases by plasmodia has rather tended to confirm this belief.

2. Lieut.-Col. T. G. N. Stokes, M.B., I.M.S., Director of Public Health, Central Provinces, states:—

"Enquiries have been made in this province and the answers on the whole amount to this—G. P. I. and tabes are very rare among Indians in the Central Provinces."

3. Major H. W. V. Cox, I.M.D., Superintendent, Punjab Lunatic Asylum, Lahore, states:—

"From the records of this asylum during the years between 1907 and 1921, three cases of G. P. I. were admitted, of whom only one was an Indian."

4. Major W. S. J. Shaw, M.D., I.M.S., Superintendent, Central Lunatic Asylum, North Yeravda, Poona, writes:—

"I have seen over 20 cases of G. P. I. among Indians. There can be no doubt that G. P. I. exists among Indians, though it is nothing like so common as it is among Europeans."

5. Lieut.-Col. P. N. O'Neil, C.I.E., D.P.H., I.M.S., Superintendent, Lunatic Asylum, Calicut (Madras), writes:—

"Since 1897, out of total admissions of 1,243, only one case has been diagnosed as G. P. I. and then on insufficient grounds."

6. Lieut.-Col. J. C. S. Oxley, I.M.S., Superintendent, Lunatic Asylum, Nagpur, C. P. writes:—

"I am unable to find any case of G. P. I. recorded in this asylum for the last 20 years."

7. The late Major S. C. Chuckerbutty, I.M.S., Superintendent, Central Lunatic Asylum, Berhampore (Bengal), wrote:—

"In this asylum, no such case has been diagnosed by my predecessors. My experience of this place leads me to the belief that general paralysis of the insane cases undoubtedly exist among natives of India."

8. Lieut.-Col. E. A. R. Newman, C.I.E., M.D., I.M.S., Superintendent, Lunatic Asylum, Dacca, states:—

"No cases of G. P. I. have been recorded here."

9. Lieut.-Col. W. D. Ritchie, I.M.S., Superintendent, Lunatic Asylum, Tezpur, Assam, writes:—

"Searching the records of the last 23 years, we have failed to find a case of this disease. (G. P. I.)."

10. The Superintendent, Lunatic Asylum, Benares, writes:—

"There have been no cases of progressive

paralysis as far as the records of the asylum show for several years."

11. Sir Leonard Rogers, Kt., C.I.E., M.D., F.R.S., writes:—

"All my experience is post-mortem and we never got any post-mortem on G. P. I. or tabes during the twenty years that I was Pathologist in Calcutta. I remember Colonel Megaw showing a very early case of tabes at the Calcutta Medical Society, some years ago."

12. Capt. J. Rodger, I.M.S., Officer Commanding, Indian Station Hospital, Sitapur, writes:—

"There is no record of any cases of G. P. I. or tabes dorsalis in this hospital as having occurred during the past five years among an average garrison for the same period of 20 Europeans and 1,550 Indians."

13. Lieut.-Col. H. M. Brown, I.M.S., Officer Commanding, Indian Station Hospital, Lucknow, states:—

"No case of either G. P. I. or tabes among Indians has been admitted to this hospital between 1917 and 1922."

14. Captain M. Prasad, I.M.S., Karachi, Venereal Specialist, Western Command, writes:—

"The incidence of both these diseases (G. P. I. and tabes) among Indians is very small. During my experience of about six years of venereal practice in this country I have come across only two cases of tabes; one was a Hindu and the other an Indian Christian. The Superintendent of the Lunatic Asylum, Agra, in 1915 told me that he had about 5 Indians in his asylum suffering from G. P. I. I do not think Indians have any special immunity to these two diseases."

15. Lieut.-Col. C. A. Sprawson, I.M.S., Principal, Medical College, Lucknow, writes:—

"I have only (in 22 years' practice amongst Indians) seen one Indian case that I regarded as G. P. I. My students who go to Col. Overbeck-Wright at Agra for training in mental diseases are taught that G. P. I. is not uncommon in India. I do not see the cases. I have only seen one Anglo-Indian case of G. P. I. in India. I have only seen 4 cases of tabes dorsalis in 22 years in India, 3 of these were in Anglo-Indians and one in an Indian."

16. The Officer Commanding, Indian Station Hospital, Kirkee, states:—

"There have been no cases in recent years of either disease, (G. P. I. or tabes)."

17. The Officer Commanding, Indian Station Hospital, Ahmadnagar, states:—

"Neither myself nor the medical officers under my command have seen any cases of G. P. I. or tabes amongst Indians."

18. Dr. D. N. Ghosh, M.B., Teacher of Medicine and Pathology, Orissa Medical School, Cuttack, writes:—

"I cannot say I have seen a true or typical case of G. P. I. or tabes in the course of my 20 years' experience."

19. The Officer Commanding, Indian Station Hospital, Alipur, states:—

"Records of this hospital show that no case of G. P. I. or tabes has been admitted during the last four years. Both these diseases are exceedingly rare in Indians of this type (sepoys), whereas syphilis is common."

20. The Officer Commanding, Indian Station Hospital, Belgaum, states:—

"Out of 73 cases of syphilis admitted into this hospital during the last 8 months no case of G. P. I. or tabes has occurred."

21. The Officer Commanding, Indian Station Hospital, Deolali, writes:—

"No case of G. P. I. or tabes has been recorded during the past 5 years, although 240 cases were treated for syphilis."

22. Lieut.-Col. A. M. Harvey, I.M.S., Officer Commanding, Indian Station Hospital, Marine Lines, Bombay, writes:—

"176 cases were treated for syphilis during the last 5 years. No cases of G. P. I. have been shewn in my returns. It is possible that a case of G. P. I. may have passed through the hospital but any case shewing a positive Wassermann reaction would be returned as 'syphilis.' The same applies to tabes."

23. Lieut.-Col. R. K. Mitter I.M.S., District Medical and Sanitary Officer, Tanjore, writes:—

"No cases of G. P. I. among Indians and Europeans seem to have been recorded here of late years. Only stray cases of tabes among Indians have been recorded."

24. The Officer Commanding, Indian Station Hospital, Poona, states:—

"There is no record of any such cases (G. P. I. or tabes) as having been at any time admitted to this hospital."

25. Major A. Whitmore, M.D., I.M.S., Civil Surgeon, Rangoon (West) writes:—

"I am afraid that I can give but little assistance in the enquiry about G. P. I. among Indians and Burmese. I have had no experience, but I do not think that I would see such cases if they do occur. Of tabes dorsalis I thought for a long time that it did not occur at all in the native community, either in Indians or in Burmese. However, I am satisfied that the diseases do occur among Indians and Burmese, but how frequently or how rarely, I have no means of knowing. However, I consider the diseases are so rare that I could not feel sure of securing a typical case for demonstration purposes to the students during their 4th year of training."

26. Lieut. F. H. O'Leary, I.M.D., Offg. Superintendent, Lunatic Asylum, Rangoon, states:—

"Statistics regarding the incidence of G. P. I. amongst Indians and Burmese amongst the asylum population from 1911 are herewith forwarded. The nationality of the cases is only ascertainable from 1917 onwards, and from my personal knowledge and enquiries I am almost certain that only one European was admitted since 1917; 29 cases of G. P. I. were admitted during this

period, of whom 11 were admitted since 1917. Of these 7 were Burmese, 2 Chinese, 1 European and 1 Indian."

27. Major-General R. C. McWatt, M.B., F.R.C.S., I.M.S., then Inspector-General of Civil Hospitals, Punjab, states:—

"Replies received from civil surgeons and other medical officers in the Punjab show that G. P. I. and tabes are very uncommon in India."

28. Lieut.-Col. P. St. C. More, I.M.S., Civil Surgeon, Rawalpindi, writes:—

"During thirty years' experience, I have never seen a case of either G. P. I. or tabes among either Indians or Europeans."

29. Lieut.-Col. J. G. G. Swan, C.I.E., I.M.S., Civil Surgeon, Ferozepur, writes:—

"I have never seen a case of tabes or G. P. I. among Indians since I came to this country."

30. Lieut.-Col. D. M. Davidson, C.I.E., M.D., I.M.S., Civil Surgeon, Lahore, writes:—

"As far as I can judge G. P. I. is not common among Indians."

31. Lieut.-Col. H. Halliday, M.B., I.M.S., Civil Surgeon, Simla, West, writes:—

"I have not seen one case of G. P. I. amongst Indians during my services. I have seen one case of tabes in an Indian in the last 5 years."

32. Lieut.-Col. W. W. Jeudwine, I.M.S., Civil Surgeon, Jullundur, states:—

"No cases of tabes or G. P. I. have been seen by me among Europeans in this country. I have seen two cases of tabes in Indians."

I sent copies of the same questionnaire to various parts of the tropical and sub-tropical world outside the Indian Empire, namely to Egypt, South Africa, Nigeria, the Gold Coast, Ceylon, Hong Kong, the Federated Malay States, Japan, Madagascar, the Belgian Congo and the United States of America. In due course a great deal of information reached me, some of which was very interesting. The report of Dr. Dudgeon, Medical Superintendent of the Mental Hospital at Khanka, Egypt, was so important that I sent it at once to Professor Kræpelin, very unfortunately without taking a copy of it. The opinion of Dr. Dudgeon was to the effect that up to the outbreak of war in 1914 general paresis among the coloured population of Egypt was very rare, but since the war a good many cases of general paresis had been brought to his notice.

The following are summaries of reports received by me from the majority of the countries cited above:—

SOUTH AFRICA.

The Secretary for the Interior reports:—

1. The incidence of general paralysis of the insane among the natives of South Africa is low, amounting to about 1 per cent. of the total patients under care from the year 1921. It was stated by Dr. Greenlees, who was Medical Superintendent of the Grahamstown Mental Hospital in about 1906, that he had never known a case of general paralysis of the insane, but as early

as 1907 cases were found in the Pretoria Mental Hospital.

In the year 1918 there were 27 cases out of a total population of 2,609 patients under care. Dr. Dunston, the Commissioner, Mental Disorders, is of opinion that there has been no increase in the incidence of general paralysis during the last 10 years.

2. *Tabes* is rare among the natives of South Africa and not nearly so prevalent as among Europeans.

3. Natives display less immunity to other diseases than Europeans.

4. Affections of the skin and bones in syphilis are extremely common among natives; more so than among Europeans.

5. Syphilitic affections of the brain and meninges are not so common among natives as among Europeans and I would say that the native is less prone to such affections.

6. Eye symptoms in cases of *tabes dorsalis* are about the same in natives as among Europeans.

UNITED STATES OF AMERICA.

Surgeon-General B. J. Lloyd, Bureau of Public Health Service, Washington, in his letter dated the 26th December 1924, supplies the following table:—

Race and sex.	DEATHS IN THE REGISTRATION STATES (INCLUDING DISTRICT OF COLUMBIA) FROM:					
	Tabes dorsalis (Locomotor ataxia).			General paralysis of the Insane.		
	1923.	1922.	1921.	1923.	1922.	1921.
Negro:—						
Male ..	95	89	69	524	498	425
Female ..	21	27	18	202	209	185
Indian:—						
(North American)						
Male ..	2	2	—	6	4	—
Female ..	—	—	—	2	—	—
Chinese:—						
Male ..	5	5	4	11	13	16
Female ..	—	—	—	—	—	—
Japanese:—						
Male ..	—	1	1	7	6	5
Female ..	—	—	—	—	—	—
Other coloured:—						
Male ..	1	—	—	2	—	1
Female ..	—	—	—	—	—	—

NOTE.—The registration States formed 80.9 per cent. of continental United States in 1921, 84.2 in 1922 and 86.4 in 1923.

CEYLON.

Dr. R. L. Spittal, F.R.C.S., Wycherley, Buller's Road, Colombo, furnishes the following information:—

"In estimating the relative frequency of neurosyphilis among Europeans and natives, it must be remembered that the latter are much the more prone to neglect adequate treatment, to submit themselves to treatment only when the disease is well advanced, and to discontinue treatment as

soon as symptoms improve. The whole problem appears to me to be so involved that it defies solution without exact data. Therefore general impressions are more or less valueless, or even deductions from statistics that do not reckon with the factors I have mentioned."

The P. C. M. O. & I. G. H. Medical Department, Colombo, writes in his letter No. 3694 dated the 27th March 1924:—

"G. P. I., *tabes* and syphilis are probably as common among natives as among Europeans. There is, as far as I can say, no difference whatever in the way these diseases affect the different races. Any apparent differences are perhaps explainable by varying conditions of hygiene and diet."

Dr. L. D. Parsons, Medical Superintendent of the Colombo Lunatic Asylum, writes in his letter dated the 23rd February 1924:—

"As regards G. P. I. from 1914–1923 there have been 7 cases, all in males, of which 4 died here and 3 were discharged (of these 5 were not natives of Ceylon, one was a Singhalese and one a coast Moor)."

NIGERIA.

Dr. W. Alexander, Director, Medical and Sanitary Service, Lagos, Nigeria, W. Africa, in forwarding the summary of the replies received by him from medical officers throughout Nigeria, makes the following remarks:—

"I would like you to understand however, that over practically the whole of Nigeria only a small portion of the illnesses occurring are ever brought to the notice or under the treatment of the medical officers. For this reason it is impossible to generalise from such observations and statements as are given in the summary. For example it was thought at one time that cancer never occurred among natives, whereas increased confidence on the part of the natives has brought to light a considerable number and diversity of such cases.

The same experience applies to other diseases and may well apply to general paralysis of the insane and *tabes*."

Summary from the reports received from the Medical Officers of Nigeria.

1. The incidence of G. P. I. among natives of Nigeria and Europeans?

Three deaths from general paralysis of the insane are recorded in Lagos during the period 1918–1923. The Medical Officer, Lokoja states that he has seen "probably half a dozen cases of general paralysis of the insane among natives and non-natives of Nigeria in the last 13 years." The rest of the medical officers are unanimous in their replies that they have never seen a case of general paralysis of the insane among the natives of Nigeria.

There is no record of any case occurring amongst Europeans ordinarily resident in Nigeria. This may be accounted for by the fact that a European would be invalided out of the country as soon as his mentality became abnormal. It

would be very unlikely for any European to remain in this country with well-marked symptoms of G. P. I.

2. The incidence of tabes dorsalis among the natives of Nigeria and Europeans?

Here again replies are practically unanimous that cases of this disease among natives of Nigeria are extremely rare. Two such cases were described in the Annual Medical Report for Nigeria for 1922 by the medical officers of Port Harcourt.

3. Whether there are any records or data of any sort pointing to a recent increase in the incidence of either of these diseases?

All the replies are in the negative.

To the more or less chronically-infected condition of the inhabitants of Nigeria with the malarial parasite is attributed the absence of parasyphilitic cerebral manifestations.

4. If natives of Nigeria display a greater immunity to other diseases besides general paralysis of the insane than is the case among Europeans?

The majority of replies seem to indicate that the native of Nigeria has a greater amount of immunity towards the following diseases than Europeans display:—

(a) Malaria, (b) Yellow Fever, (c) Enteric Fever, (d) Carcinoma, (e) Trypanosomiasis, (f) Syphilis.

In the case of syphilis, only one or two medical officers call attention to this and attribute it to a certain amount of immunity handed down from one generation to another, because this disease is to a considerable extent left untreated amongst the natives of this country.

5. If affections of the skin and bones are more (or less) common in syphilis among natives of Nigeria than among Europeans?

Judging from replies received there seems to be no doubt in the minds of medical officers that visible manifestations of this disease are much more common in natives of Nigeria than in Europeans.

Is this to be wondered at? Syphilis is one of the best treated diseases in Europe to-day. It responds readily to treatment. Moreover the governments of different countries of Europe, realizing their responsibilities, have provided centres for free treatment so that the disease is well under control although the incidence per head of population may not be much less than it was, say, ten years ago.

Equally truthfully it may be remarked that the bulk of the native population do not readily come forward to receive the benefits which modern medicine can confer on them.

6. If syphilis is more (or less) prone to affect the brain and meninges among natives of Nigeria than among Europeans?

The bulk of opinion is that it is extremely rare to see natives of Nigeria suffering from para-syphilitic cerebral affections.

Less rare however is it to come across, from

time to time, cases, partial or complete, of paraplegia due to myelitis of the cord following on endarteritis obliterans of the vessels of the cord—a secondary syphilitic manifestation.

7. If eye symptoms are more (or less) common in cases of tabes dorsalis in natives of Nigeria than among Europeans?

Few cases of this disease have been recorded, two only within the last few years. In neither case was any record made of the eye condition.

FEDERATED MALAY STATES.

Dr. W. F. Samuels, Medical Superintendent, Central Mental Hospital, Tanjong Rambutan, Federated Malay States, in forwarding a list of the cases of general paralysis of the insane, writes as follows in his letter dated the 18th January 1924:—

“As to the incidence of general paralysis of the insane, I attach a list of the cases which we have had here since I opened the hospital in 1911.

As to race, it is almost invariably the Chinese who suffer from general paralysis of the insane. We have had a few Japanese, but I can only number one Tamil and one Japanese. There have been no Malays, although they are full of syphilis.

One must remember that the Malay has no troubles or worries of any sort. He can always get enough to eat, and so long as a Malay can eat and sleep nothing else worries him.”

List of General Paralysis of the Insane.

1911	..	..	..	1
1912	..	..	..	10
1913	..	..	..	11
1914	..	..	..	12
1915	..	..	..	11
1916	..	..	..	25
1917	..	..	..	24
1918	..	..	..	37
1919	..	..	..	22
1922	..	..	..	27
1923	..	..	..	22

In conclusion, I would like to refer to an article by Dr. Louis Wender, entitled “Psychoses prevalent on the Isthmus of Panama” published in the *American Journal of Psychiatry* in October 1923. Dr. Wender found that out of 414 consecutive cases admitted into the Corozal Hospital at Panama, between 1917 and 1918, there were 14 cases of general paresis among the coloured, and 10 among the white admissions. All the cases were males. Dr. Wender writes:—

“We included in this group all individuals showing marked defective judgment and reasoning powers, impaired memory for recent and remote events, grandiose delusions, depressions, excitement, and simple mental deterioration.”

“Neurological symptoms such as pathological deep reflexes, pupillary, gait and speech disturbances, were present in all these cases. The Wassermann reaction was positive in nearly all cases, the spinal fluid was positive, and the colloidal gold reaction of a paretic curve was present in all case. No female patients, either white

or coloured, suffering from this disorder, were admitted (at present several coloured females are here with paresis). At one time it was believed that the coloured race was immune to general paralysis of the insane; that this theory is not well-founded has been demonstrated. This theory was probably due to a failure to recognize this disorder in the coloured on account of the lack of grandiose delusions which were then thought to be characteristic manifestations of general paralysis of the insane. This disorder in the coloured, however, usually manifests itself in simple dementia. Of the 14 coloured male admissions here, there was only one patient who manifested grandiose delusions, and difficulty would have been encountered in making the correct diagnosis in the others if laboratory facilities were not available. The absence or the lesser preponderance of paresis among the females cannot be accounted for other than by the fact that the central nervous system of the female is very sensitive and unstable and breaks down much earlier from any toxæmia, such as the various types of infection, exhaustion psychosis, systemic syphilis, pellagra, etc."

KATAKAR OIL POISONING.

By SARASI LALL SARKAR, M.A., L.M.S.,

Civil Surgeon, Malda.

THE following occurrence shows that symptoms like those of epidemic dropsy have resulted in some cases from the use of adulterated mustard oil.

In a village named Attar, situated about 3 miles from the Bamangola Thana in Malda district, there occurred a few cases resembling epidemic dropsy, which on careful investigation were found due to the use of mustard oil adulterated with what is known as *katakar* oil. The cases occurred about three years ago in August, 1922. I intended to publish the reports of the cases, after ascertaining, if possible, something about the physiological action of *katakar* oil. But as I have not found this last to be possible I content myself with publishing the notes of these interesting cases from my note book, on the eve of my transfer from this district.

Katakar oil is the oil obtained from the mustard-like seeds of an Ayurvedic medical herb known as *Sialkata* which has multi-lobed thorny leaves and produces bell-shaped bright yellow flowers. The scientific name of the plant, as ascertained from the Curator of the Royal Botanical Garden, Calcutta, is *Argemone mexicana* Linn. an American weed that has run wild throughout the country, and is commonly known as the Mexican prickly poppy.

The following is a brief account of the occurrence resulting from the use of mustard oil adulterated with *katakar* oil.

Five or six days before the *Janamastami* festival, i.e. on the 9th or 10th August, the wife of Gamaroo, an oil-man, prepared some *katakar* oil,

as generally used medicinally for such skin diseases as scabies and eczema, in an oil-mill and the oil-mill was put aside without being washed or cleansed properly. Her husband, the oil-man was ignorant of this fact and he prepared some mustard oil in the same oil-mill, and this was taken for cooking purposes just before the *Janamastami* festival in the houses of the following persons:—

- (1) Ramchandra Mondal, (2) Pancha Mondal, (3) Moti Mondal.

The main ceremony and the chief pleasure of the *Janamastami* festival is frying cakes of the thick juice obtained from palm fruits in mustard oil and eating them. Thus a large quantity of this adulterated oil went into the system of the members of these families on the occasion of this festival, and all the members of these three households were affected.

In the house of Ramchandra Mondal, there was a boy aged 5 years and another boy aged 12 years, four adult females and seven adult males ranging from about 17 years to 40 years. All these were affected.

In the house of Pancha Mondal a boy aged 7 years and an adult aged about 42 years who were badly affected died subsequently. Besides this, three boys ranging from 10 to 13 years of age and one adult male of 52 years of age and two adult females were affected in the house.

In the house of Moti Mondal two boys aged 5 years and 7 years, three adult females, and two adult males were affected.

The date of the onset of symptoms was the 12th of August, 1922. The earliest symptoms were excessive spitting and vomiting, which was followed by disturbance of the bowels, followed by gradual œdema of the feet and legs. The affected persons placed themselves under the treatment of a village quack on the 21st of August, who treated them up to the 31st of August without benefit. Meanwhile the affected families were able to discover the fact that their disease was due to the use of adulterated oil on *Janamastami* day. On hearing about the epidemic, I wrote to the Medical Officer, Bamangola to send me any information which he possessed regarding the cases. He confirmed the fact that the outbreak of the disease which so resembled epidemic dropsy was really due to the use of adulterated oil, but the clinical description was very meagre in his report and is contained only in the following lines.

"I was called on to attend the cases on 5th September, 1922 and found the following symptoms.

- (1) Intense pain all over the body.
- (2) Inflammation of the leg from the toes to the hip.
- (3) Profuse diarrhoea in some cases, and in others severe constipation.
- (4) Slight fever running up to 101° F."

The cases were subsequently seen by the Medical Officer a month later, when he found these symptoms to be gradually subsiding.

I saw some of the cases a month later and found some amount of solid œdema left on the lower part of the leg and feet in some cases.

Two of the girls who went to buy oil from the oil-man, finding only a very small quantity of residual oil left, smeared the oil over their heads. On the night of the same day, the scalp was found to be inflamed with a burning sensation on the head and later on there was marked falling off of the hair.

Regarding the properties of the oil derived from the seeds of this plant, the following information is contained in the *Dictionary of Economic Products* by Sir George Watt, Vol. I, part III, pp. 306-309.

"The seeds yield a pale yellow, clear, limpid oil; used in lamps and medicinally in ulcers and eruptions.

There is also a great difference of opinion as to the action and dose of the oil of *Argemone mexicana*."

Postscript.—The following is a report on the analysis of *katakar oil* from the Director, Bengal Public Health Laboratory:—

	Extracted with ether.	Expressed by machine.
Refractometer reading at 40°C. . .	60.9	62.0
Saponification value . . .	189.8	193.2
Iodine value . . .	123.88	125.3
Reichert Wollry value . . .	0.38	0.26
Acid value . . .	25.16	8.4
Sp. gravity at 15.5°C. . .	—	0.9331

THE TREATMENT OF BUBONIC PLAGUE WITH INTRAVENOUS INJECTIONS OF IODINE.

By A. C. BHARADWAJ, L.M.P.,

House Surgeon, King Edward VII Hospital, Benares.

PLAGUE has baffled all attempts on the part of medical men to discover any successful treatment to combat this fell disease, which has been ravaging tropical countries for more than half a century. Any method of treatment, therefore, that makes the future more hopeful by reducing the total mortality will be welcomed and appreciated both by the profession and by the general public, especially so as the treatment up to this time has been only a symptomatic one, without giving satisfactory results.

Sceptics may say that any drug that has not been scientifically tested is only empirical and cannot be approved as such; but iodine has proved its value and stood the test of time in various diseases. There is therefore no ground why its administration should be called empirical when administered to plague cases, knowing as we do that it acts by increasing the resisting power of the patient through leucocytosis.

Shortly after injecting a full dose of iodine intravenously the number of leucocytes in the peripheral blood is more than doubled and the temperature falls 2 to 3 degrees F. within a few hours.

No one has found iodine to be an antipyretic and the lowering of the temperature therefore indicates that the increased number of leucocytes overcomes the bacilli. There is no reason why such a useful drug should be discarded with contempt.

In Northern India the epidemics of plague have been extraordinarily severe and I tried from time to time all the treatments advocated in text-books, including excision of the glands, but they were mostly a failure. At last I came upon the article of Lieutenant-Colonel Jeudwine in the December 1923, issue of the *Indian Medical Gazette* and resolved to try intravenous iodine in plague cases. Prior to this I had been using it in cases of syphilis and septic ulcers with excellent results.

In 1923, an epidemic of plague broke out in Fyzabad district and thousands died within the short space of three months. The virulence of the disease was so great that the patients usually became delirious within a few hours and died within a few days.

The people were in the beginning reluctant to take intravenous injections, but when they saw and heard of severe cases recovering I had so much work that it became almost difficult to cope with it.

I treated about a hundred cases of plague in all with iodine injections and got about 80 per cent cures. The early cases were very easily brought under control; while patients in an advanced, delirious state and in the late stages of attack with fumbling speech and soft slow pulse did not do well. Most of the unsuccessful cases that gave the mortality of 20 per cent fall under this category. Dr. Naquvi of Jalalpur, a colleague of mine, also followed the same line of treatment with some material difference in the doses given and in the local treatment of the buboes. He also obtained very good results.

I use a solution of 18 grains of iodine with 36 grains of potassium iodine in 4 ounces of normal saline solution, and inject intravenously 5 to 10 c.c. of this in one dose every day for four consecutive days. This works out at an approximate dose of pure iodine of from $\frac{3}{4}$ to $1\frac{1}{2}$ grains and that of potassium iodide from $1\frac{1}{2}$ to 3 grains per day. Thus a maximum amount of iodine is injected directly into the blood stream without causing any untoward symptoms. People who injected tincture of iodine even in very small quantities report that in a certain number of cases thrombosis occurred, an experience unknown to me even after giving not less than six hundred injections of the drug in aqueous solution. In spite of

repeated injections of the solution into the same vein in several cases no thrombosis occurred.

I always insert the needle into the vein first, and when the blood gushes out, the nozzle of the syringe is mounted on to the needle and the contents emptied very slowly. Great care is always taken that not a single drop passes either into the coats of the vein or into the surrounding tissues; neglect in this respect at once sets up severe cellulitis and phlebitis which may go on to thrombosis of the vein.

One may here discuss the local treatment of the buboes as well. With the injections of iodine I at first injected 5 or 6 minims of pure carbolic acid into the bubo. This caused no pain but the tissues invariably sloughed and a foul ulcer resulted which took a long time to heal. Shortly after, while reading the report of the German Commission on plague, I came across mention of the great antiseptic power of mercury in destroying *Bacillus pestis*, and began to inject 1/16th grain of hydrarg perchloride in 2 c.c. of water into the bubo. This had the desired effect of reducing the size of the bubo to a half within 24 hours. The pain subsided and the general condition of the patient also improved much more quickly than with intravenous injections of iodine alone. There was no suppuration or sloughing. Later, I stopped injecting this solution into the bubo, and instead injected it subcutaneously into the lymphatic area drained by the particular group of glands in which the bubo had formed. There was no pain beyond a slight smarting at the time of injection and no sloughing of the subcutaneous tissue occurred. This procedure was found more effective than either of the two preceding methods.

With this treatment I always give the following mixture containing:—

Potass. Iodide	..	..	grs. v
Spirit Ammon. Aromatici	..	..	m. xx
Tinct. Strophanthi	..	..	m. ii
Spirit Vini Gallici	..	..	drs. ii
Aqua ad	..	..	oz. i

For one dose. To be taken every four hours.

This mixture is given from the very start, and no nourishment except water is allowed for the first three days. The patient does well on this medicine and has no desire for food. If the bowels are constipated, as they often are, I give an initial dose of 3 grains of calomel with 10 grains of sodium bicarbonate at bed time, followed by a Sedlitz powder the next morning. To patients who are not within easy reach of competent medical aid for injections or who are not willing to be injected I prescribed this mixture alone and it gives some 40 per cent of cures.

Summary.

1. Iodine injection in the form of aqueous solution is the best remedy hitherto known

for plague. It is harmless and acts by increasing the number of leucocytes.

2. Early cases are very easily controlled and 3 to 5 injections of 5 to 10 c.c. of the solution are sufficient to effect a cure.

3. The iodine treatment gives better results if it is supplemented with injections of pure carbolic acid into the bubo; or of 1/16th grain of hydrarg perchloride in 2 c.c. of distilled water into the lymphatic area drained by the group of glands in which the bubo has formed. No mercurial poisoning resulted from as many as 3 injections given consecutively. Besides, many medical men have injected as strong a solution as one per cent hydrarg perchloride into various veins without any ill effect.

4. No nourishment except water should be given for 3 days, and a mixture containing potassium iodide and stimulants should be given every 4 hours.

CORRIGENDUM.

In Dr. S. L. Bhatia's article on blood-sugar and sugar tolerance in our issue for last December, p. 568, under the heading Hypoglycemia, renal glycosuria, second paragraph, for:—"The urine may contain even 2 per cent of sugar when the blood-sugar content is less than 1 per cent," please read;—"The urine may contain even 2 per cent of sugar when the blood-sugar is less than 0.1 per cent."—Editor, I. M. G.

A Mirror of Hospital Practice.

THE EFFECT OF POSTERIOR GASTRO-JEJUNOSTOMY ON CHRONIC DUODENAL ULCER.

By W. C. PATON, M.C., M.B., F.R.C.S.E.,
MAJOR, I.M.S.,

Civil Surgeon, Coonoor.

We know that chronic duodenal ulcer is a very common condition in the Madras Presidency, whatever it may be in other parts of India. We know that posterior gastro-jejunostomy in the great majority of cases relieves the patient of all his symptoms. But we do not often have the opportunity of seeing the condition of the ulcer subsequent to operation. That is my only excuse for reporting the following case:—

Anthony, Indian Christian, aged 35, a butler, was admitted to the Lawley Hospital, Coonoor, on the 7th May 1925, with a typical history of chronic duodenal ulcer, extending over 12 years. Within recent months the symptoms of pyloric obstruction had been increasing. He was operated on on the 8th of May. There was found a very chronic ulcer on the anterior surface of the first part of the duodenum, with great thickening, and a considerable amount of stenosis.

Posterior gastro-jejunostomy was performed and the appendix removed. The dietetic

after-treatment consisted as usual of fluids only for seven days, followed by a diet of milk, bread, sugar, eggs, broth and a little rice for the rest of his stay in hospital. A bismuth and soda mixture was given after food when solid food was commenced.

He had no dyspeptic symptoms whatever after the operation, and was discharged on June 2nd with the wound apparently soundly healed. He remained quite free from dyspeptic symptoms, was eating his ordinary food, and improved greatly in general health, but for some reason he developed a ventral hernia. He was re-admitted for this on 25th October 1925, and operated on the next day. The hernia was repaired in the ordinary way, and the interest of the second operation lay in the opportunity to inspect the stomach and duodenum again. The first part of the duodenum was perfectly soft and of normal thickness, with only some small thin white patches on the peritoneal surface to mark the site of the previous chronic ulcer. The ulcer was apparently quite healed. The pylorus was perfectly patent and the stomach normal. The site of the anastomosis was healthy. Five and a half months after operation, therefore, in this case there was direct evidence that a very chronic duodenal ulcer had healed as a result of posterior gastro-jejunostomy.

A CASE OF EXTENSIVE FRACTURE OF THE SKULL WITH INJURY TO THE BRAIN. ESCAPE OF BRAIN MATTER, AND RECOVERY.

By A. S. DAWSON, L.M.P.,

Medical Officer, Thonze, Tharrawaddy District, Burma.

MA MYA SEIN, aged 8 years, a half-caste Burmese girl of the town of Thonze, was brought to the Civil Hospital, Thonze in an unconscious condition, said to have been knocked down by a motor lorry. She was taken to the hospital immediately after the accident at 11 a.m. on 31st October 1925. On admission the patient was in a comatose state; there was profuse bleeding from the left ear, the pupils were insensitive to light and half dilated; the pulse was slow but full.

The following injuries were found:—

1. An abrasion measuring 3 in. in length and 3 in. in breadth situated on the left temple.
2. A lacerated linear wound situated $2\frac{1}{2}$ in. above the right ear on the right parietal eminence $\frac{1}{4}$ in. in length, deep down to the skull which was fractured, the fracture extending anteriorly to the frontal bone, posteriorly to the parietal bone and outwardly to the temporal bone; here the line of fracture extended to the base of the skull.
3. A lacerated linear wound $\frac{1}{4}$ in. in length deep down to the skull, situated $3\frac{1}{4}$ in. above the outer extremity of the right eyebrow. The frontal bone was fractured, the line of fracture being continuous with the line of fracture mentioned under injury No. 2.
4. A lacerated wound directed transversely on the back of the head, 3 in. above the nape of the neck.

5. An abrasion on the right shoulder.
6. An abrasion on the right knee cap.
7. An abrasion on the back, over the right lumbar region.
8. An abrasion on the back close to injury No. 7.
9. An abrasion on the back close to the spinal border of the right scapula.
10. An abrasion on the right side of the chest below the right axilla.
11. An abrasion on the back posterior to the left axilla.
12. Fracture of the base of the skull on the left side as indicated by hæmorrhage from the left ear.
13. A contusion close to the left ear over the mastoid process.

The breathing was jerky and laboured. On admission first-aid dressings were applied after cleaning the parts thoroughly with antiseptics and ammonium carbonate given to inhale. A subcutaneous injection of "Hæmostyl," 8 c.c., was given. Within a few minutes the hæmorrhage from the ear stopped. The condition of the patient was carefully watched. An ice cap was also kept on the head till 4 p.m.

The same afternoon, at 4-30 p.m. the wounds on the head were explored by enlarging them under light chloroform anaesthesia. The depressed bones in the lines of fracture were elevated and the wounds were closed quickly as the condition of the patient at this time was such that prolongation of the operation might have led to fatal collapse. A rectal saline was administered and repeated every 4 hours during the day and night till the signs and symptoms of collapse abated. The next day, i.e. on 1st November 1925, the child began to be restless but regained the semi-conscious state at 3-hour intervals. During the conscious intervals nourishment was given, together with 10-grain doses of calcium chloride. The next day (2-11-1925) the patient became comatose and signs and symptoms of pressure on the brain were noted.

On 3rd November 1925, I decided to trephine the skull with a view to turn out clots and depressed bone. I opened the skull by excising the splintered bones: one of them measured $2\frac{1}{2}$ in. in length, 1 in. in breadth; the other was a sharp splinter $1\frac{1}{2}$ in. long and was found driven deeply into the brain tissue. At this spot the brain matter was escaping from a tear in the dura. The escaped pieces of the brain were removed, the other bigger pieces of the skull were also elevated and a lot of clot which was pressing on the brain was also removed and the parts were thoroughly cleansed. The wounds were closed leaving a small space for drainage.

The patient stood the operation very well as we had to administer very little chloroform, the patient already being in a comatose state. After this rectal salines were continued at 3-hourly intervals. The next morning the patient began to regain consciousness at intervals of 4 hours. On the 4th day after operation she regained consciousness. Nourishment and a stimulant mixture were given. Since then the patient recovered very rapidly although the injury was a very severe one, and all the wounds healed quickly. She was discharged cured on the 30th November 1925. The photograph shows her condition at the time of discharge from hospital.

Note.—The case is of interest as it was one of extensive fracture of the skull, involving the base of the skull and injuring the brain, with escape of brain matter. Operation was undertaken as a desperate and last resort.

My thanks are due to Dr. Lao Htin Poh, Civil Surgeon, Tharrawaddy, who kindly permitted me to perform the operation and also allowed his assistants to help me.

A photograph of the child, taken after cure is attached.



A NOTE ON THE TREATMENT OF AMOEBIC ABSCESS OF THE LIVER.

By H. CHAND,
CAPTAIN, I.M.S.,
Civil Surgeon, Kangra.

I READ with interest the account given by Lieutenant J. P. Arland, I.M.S., of a fatal case

the result might have been more favourable. I had a similar case recently admitted to the Civil Hospital, Dharmsala, of which particulars follow. My object in publishing this case is to draw the attention of medical officers to the advantage of the treatment of amoebic abscess of the liver by aspiration, combined with injections of emetine, instead of by open operation.

Mansukh, a Hindu male, aged 40, was admitted to the Civil Hospital Dharmsala, on 18th June, 1925, complaining of a painful swelling in the right hypochondriac region and fever with rigors, its duration being about 5 months.

Previous history.—He contracted dysentery two years previously.

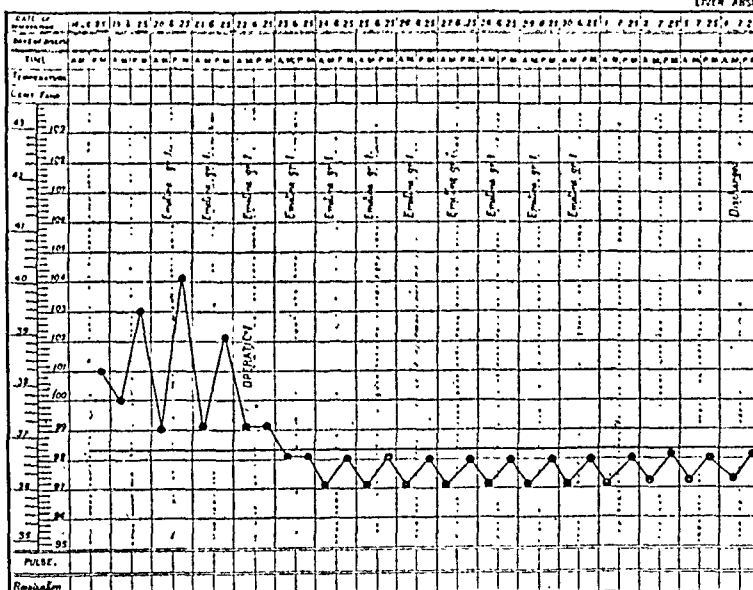
Condition on Admission.—The patient was very anæmic, wasted and debilitated. There was a painful swelling reaching about a finger's breadth below the right costal margin. Temperature 101°F. He complained of evening rises of temperature and copious sweats. There was marked œdema of the feet. The differential leucocyte count was:—

Polymorphs	..	75%
Large monos.	..	22%
Lymphocytes	..	3%
Eosinophiles	..	—

A diagnosis of amoebic liver abscess was made.

Treatment.—On 20th June 1925, he was put on to daily hypodermic injections of emetine hydrochloride gr. 1. On 22nd June 1925, under chloroform the skin only over the most prominent part of the swelling was incised for about an inch. Potain's aspiration apparatus was then used and 4 pints of typically chocolate-brown coloured pus were

No. 60 Name, MANSUKH Age 40 Occupation AGRICULTURE Disease AMOEBIC LIVER ABSCESS.



of liver abscess in the *Indian Medical Gazette* for November, 1925. In my opinion, had he performed aspiration, combined with emetine injections, instead of operating upon the case,

withdrawn. One suture and a dry dressing were then applied.

From the attached temperature chart it will be observed that the patient had no rise

of temperature after the operation. In all eleven injections, each of 1 grain of emetine, were given.

The patient made an uninterrupted recovery. The swelling in the right hypochondriac region disappeared altogether and also the œdema of the feet. The patient became plump and healthy looking and was discharged cured from the hospital on 5th July 1925.

A CASE OF ACUTE HÆMORRHAGIC PANCREATITIS.

By K. M. NAYAK, L.M.S.,

Assistant Surgeon, Vellore.

THE patient, aged about 50 years, when in quite sound health suddenly took very ill on the morning of the 31st of October last. He was slightly adipose. The illness had a fatal termination and lasted for only 24 hours. He took very ill one morning and died the next. On the day of illness he got up as usual and had his early breakfast at 7-30 a.m. Since his bowels did not move satisfactory the previous day, he had taken a dose of Eno's "Fruit Salts" overnight and his bowels acted well that morning. At about 8 a.m., exactly half an hour after his meal, he felt acute excruciating pain in the epigastrium and vomited everything that he had taken. The pain was so severe and overwhelming that he was completely doubled up in 5 minutes and the pain kept coming and going every 15 minutes in severe paroxysms lasting for 5 minutes each time. The intensity was so severe as to distinguish it from that of appendicitis. The appendicular region and practically the whole of the right iliac and umbilical regions did not reveal any tender spots even on deep palpation, and the rectus muscle was not rigid. The abdomen was not board-like but tolerably soft in the beginning, but all the same, palpation was difficult as the patient was inclined to be fat and had a respectable paunch.

A perforated ulcer and passage of a gall-stone or a kidney-stone are the only common diseases giving such severe pains. The radiating character and the paroxysmal nature of the pain suggested either a gall-stone or kidney-stone. Absence of any previous similar attacks and absence of any crystals of urinary salts in the centrifugised urine led to the elimination of renal calculus. The fact that even gentle palpation elicited tenderness over the tip of the right 9th costal cartilage and that the radiating character of the pain was referred to the right shoulder blade and lumbar region, led to a tentative diagnosis of gall-stone being made. But even here there was absolutely no history of any previous attacks and he was not jaundiced. Gall-stones are said to be "tombstones erected

to the memory of typhoid bacilli" but the most careful enquiry did not elicit that he had ever suffered from typhoid fever.

General Condition.—The patient was very ill from the commencement. The pain was very acute, excruciating and exhausting. Vomiting, which was sudden and profuse in the beginning, continued for some time. His stomach was so intolerant as not to retain a teaspoonful of water or medicine. Ultimately it was limited to retching and bringing-up of only mucus mixed with saliva. His pulse was full, regular, bounding, 70 per minute, and remained like that till 4 a.m. on the morning of the 1st November, when it began to flag and became soft, small and thready. So much so that by 6 a.m. in the morning it was imperceptible and was sustained only by the administration of stimulants. In other words it was a *combined pulse*, hæmorrhagic and peritonitic. His abdomen, which was soft in the beginning, gradually became more and more distended and very tender all over. Though rigidity was not marked in the early stages, his abdomen became very rigid and tender all over later on, and was as hard as a solid block of wood. Though the abdominal tenderness was universal all over, gradual deep pressure in the epigastrium brought on excruciating pain. His temperature was normal throughout, or to be more accurate it was 98°F. In the later stages it was sub-normal and it never rose above the normal even by half a degree throughout the illness.

Treatment.—Though his bowels had moved satisfactorily that morning a soap and water enema was given straight off and was returned satisfactorily. Since appendicitis was ruled out of court from the very beginning morphia and atropine were given hypodermically and were repeated four times in the 24 hours, but had no effect on the pains at all beyond making the patient drowsy. The pain continued in the same intensity and was paroxysmal. The stomach was washed out at about 6 p.m. to stop the retching and this had some effect. Benzyl benzoate was administered thrice in 12 hours but had not the desired effect. Not being blessed with an x-ray installation in Vellore, a photograph could not be taken to clinch the tentative diagnosis of gall-stones. The nearest place where one was available was Madras, but the patient's condition at the end of 24 hours was such as to utterly prevent his removal to Madras either by train or motor. He would certainly have died on the way. Hence, after consulting another doctor and having obtained the patient's and his wife's consent, it was decided to operate on him immediately. He was put on the table at 9 a.m. He was practically dying, completely collapsed and slightly cyanosed in the face. The anaesthetist was

very nervous about his task. Saline hypodermoclysis was given in both axillæ. The patient was anæsthetised. The bladder was catheterised and as facilities existed on the spot the urine was again centrifugalised and the sediment showed nothing beyond hyaline casts.

Operation.—The operation was performed by Dr. B. Rama Baliga Ayl, B.A., M.B., C.M., District Medical Officer, Vellore, assisted by me. The usual gall-bladder incision was made on the right side commencing over the tip of the right 9th costal cartilage and extending downwards for about 3 inches. Not a drop of blood was visible till the peritoneal cavity was reached. When the peritoneal cavity was opened the first object that presented itself was the omentum, loaded with fat. When the structure was pushed aside the fundus of the gall-bladder peeped out and at the same time dark red blood-stained fluid (practically venous blood) began to well up from the wound. On collecting a sample of this fluid in a tablespoon fat globules were seen floating on the surface. Knowing that an acute pancreatitis is one of the causes of "acute abdomen" though rare, the presence of dark venous blood in the peritoneal cavity with fat globules left no doubt as to the fact of the case being one of the acute hæmorrhagic pancreatitis. At this stage of the operation the patient had a convulsion, his breathing became shallow and he expired on the table.

With the consent of his friends and relatives the incision was extended downwards, the appendicular and gall-bladder regions were thoroughly explored and found to present nothing abnormal. The peritoneal cavity was dried as far as possible and the intestines were found to be distended. The visceral peritoneum was inflamed, red and angry-looking and small white opaque spots of fat necrosis were visible in the omentum and mesentery. When the omentum and transverse colon were turned up, the whole of the transverse meso-colon, part of the mesentery and an extensive area of the posterior abdominal wall and the retro-peritoneal tissues were found to be infiltrated with blood. The pancreas itself was swollen and dark red in colour, due to infiltration with blood. The gland was removed for pathological examination which bore out the diagnosis of acute hæmorrhagic pancreatitis.

Discussion.—Acute hæmorrhagic pancreatitis, though rare, is a distinct clinical entity. Rapidly fatal termination of this disease is ample proof of the necessity for very early diagnosis and a wide knowledge of its signs and symptoms is quite essential. In my whole career of 18 years as medical student and as an assistant surgeon I have come across these cases only twice, once when I was a medical student in the year 1911 and now

a second time 15 years later. The symptoms make up a clinical picture which is quite clear and the diagnosis can in most cases be made sufficiently early. The image left on my mind by the above clinical picture is now so clear that I would not fail to recognise it a third time. Regarding the ætiology it is doubtless an acute infective process due to the presence of germs. It is said that it is not infrequently found in association with cholangitis and gall-stones which may be found blocking the ampulla of Vater. So our tentative diagnosis of gall-stone was not far from wrong. At any rate it is nearer the truth than to diagnose the condition as appendicitis or appendicular perforation. Unfortunately we could not hold a complete post-mortem.

In conclusion, I wish to express my thanks to Dr. B. Rama Baliga Ayl, B.A., M.B., C.M., District Medical Officer, Vellore, for having permitted me to publish these notes.

OPERATIONS ON OLD MEN.

By BANTA SINGH, M.B., B.S., D.T.M. (Bengal),
Jullundur City.

IN the presence of an accident or other affection threatening life, an urgent surgical operation may become necessary. In such cases the age of the patient may influence the prognosis, but not the necessity for immediate operation. In a patient suffering from strangulated hernia or depressed fracture of the skull or from some tumour of the body one would not hesitate to operate because the patient was aged.

Case.—An old man, some 80 years of age was admitted to the Phagwara Hospital, Kapurthala



State, in February 1922, with the following history. Twenty-five years previously he had noticed

that the left testicle appeared to be larger than the right. It increased very gradually in size, until ultimately a blister formed on its most dependent part; this ruptured, and foul smelling semi-fluid matter escaped of a brick-red colour. His condition on admission was as shewn in the photograph.

A diagnosis of adenoma testis having been made, he was thoroughly overhauled with regard to his heart, lungs, kidneys, etc., and appeared to be a fair operative risk. The operation was conducted in a very poorly equipped dispensary, with no assistant except a compounder, who gave chloroform anaesthesia, and as rapidly as possible to reduce risk. The parts were thoroughly cleansed, a tumour-like mass dissected out, and a drainage tube inserted into the dependent part. The patient made an uneventful recovery. Healing by granulation was naturally very slow in a patient of this age, but he was discharged cured on the 40th day.

The case illustrates the powers of recovery in an old man whose cardiac, pulmonary and renal systems were still in good order. A patient of 30 or 40 years of age with defective organs would have been a worse operative risk. Even in advanced age it is often possible to perform necessary operations; should a general anaesthetic be contra-indicated, a local one can be substituted; whilst a semi-sitting position can be substituted for the dorsal decubitus.

TWO INTERESTING CASES.

By S. K. GHOSH DASTIDAR, M.D., D.T.M.,

Assistant Surgeon, Orissa Medical School, Cuttack.

HADI SAMAL, Hindu male, aged 30 years, of Salepur village in Cuttack district was admitted to this hospital on the 13th July 1925, under Dr. B. C. Chatterji, D.T.M., Teacher of Medicine and Pathology and myself for irregular fever off and on for some time, marked enlargement of the liver, and scabies all over the body; there was slight oedema of the legs and round the ankles. He had had no treatment of any kind.

Physical examination: The liver extended three finger-breadths below the right costal margin, above to the 5th rib in the midclavicular line, and 7th rib in the midaxillary line; was slightly tender but hard and without any trace of jaundice. The spleen was not at all enlarged, but just palpable in deep inspiration. Other systems revealed no abnormality.

The blood was examined on the 15th July 1925: total leucocytes 10,000 per c.mm., polymorphonuclears, 70 per cent, large mononuclears 12 per cent, small mononuclears 18 per cent, no malaria parasite was found, but the aldehyde reaction was very strongly positive. The urine showed the presence of excess of phosphates, triple and amorphous, but no bile or other abnormality. The stool was normal and the microscopic examination revealed nothing abnormal. On the 20th the leucocyte count was 9,375 per

c.mm., and by that time the scabies was cured after active treatment with sulphur and zinc oxide ointment.

Thinking the case to be one of hepatitis, emetine hydrochloride gr. i was administered each day for 6 days from the 20th, and the liver began to shrink very rapidly, so that by the 6th of August it was hardly palpable and the leucocyte count fell to 5,625. The patient appeared to be progressing favourably.

All of a sudden a few days later he developed severe diarrhoea which did not respond to any medicine, as a result of which he died on the 13th. A post-mortem examination was conducted by me next morning. The liver was slightly enlarged and weighed 2lbs. 8 ozs.; was hard and cirrhotic; on section, of nutmeg appearance; the histological examination showed signs of chronic passive congestion. The spleen weighed 6 ozs. and was slightly fibrous. Smear examination of both the liver and spleen failed to show *L. donovani*. The intestine showed numerous small ulcers scattered throughout with a little congestion round them. The bladder wall was thickened and fibrous, and it contained thick pus-like urine with phosphatic deposit.

The points of interest in the case were:—

(1) the aldehyde reaction was strongly positive in a case of hepatitis, which was proved therapeutically by administration of emetine and subsequent fall of the leucocyte count to be such.

(2) the aldehyde reaction was positive even when no *L. donovani* could be detected in liver and spleen smears.*

II. *An Unusual Case of Ascending Pyelonephritis.*—Joykrishna Routh, a Hindu male child, 11 years old was admitted to this hospital on the surgical side on the 30th August, 1925, under Rai Bahadur Dr. J. Row, Teacher of Surgery, for severe agonising pain all over the abdomen, especially on the right side in front and behind with very irregular fever varying from 100° to 103°F and scanty micturition, lasting for more than a month.

Physical examination showed a very rapid pulse without any hurried breathing, peculiar abdominal facies, with absence of tympanites and of any swelling or tenderness at McBurney's point or any other part of the abdomen. On the 31st the leucocyte count was 25,000 per c.mm., with the polymorphonuclear cells 90 per cent and the urine was practically suppressed. The following day the leucocyte count fell to 22,875 per c.mm., but by evening the patient collapsed and died.

Post-mortem examination was conducted by me the next morning with very interesting findings. Nothing abnormal in the lungs and heart. The liver was deeply yellow and of nor-

* Failure to find the parasites after death is not conclusive evidence that the patient did not suffer from kala-azar.—Ed.

mal size, weight and consistency. A few flakes of fibrinous exudate covered the ileum near the ileocaecal valve and a small abscess with serpigenous margins was found in the posterior abdominal wall behind the ileum where the right ureter passed across behind it.

Both kidneys were embedded in big cavities filled with pus, and though apparently of normal size were completely disorganised and absolutely riddled with abscesses and necrotic areas. The ureters were thick, nodular and slightly dilated. A big stone (phosphatic), the size of a duck's egg completely occupied the cavity of the bladder leaving about one-fourth of an inch of space between it and the bladder wall. Besides it the bladder contained a few drachms of thick phosphate-laden urine.

Obviously death was due to two factors, septic absorption from the pus cavities and suppression of urine from ascending pyelonephritis due to vesical calculus.

I take this opportunity of expressing my gratitude to Major J. C. John, O.B.E., I.M.S., Civil Surgeon and the ward officers responsible for their assistance.

A CASE OF PRECOCIOUS SEXUAL DEVELOPMENT.

By M. G. RAMCHANDRA ROW, M.B., C.M.,
Chief Medical Officer, General Hospital, Pudukotah State.

I was consulted by his parents about a boy, aged about one year and ten months, who shewed unnatural development of the external genitalia. The boy was brought to me from a Chetty village about 21 miles from this town.

Family history.—The parents are Nagarthars by caste, are hale and hearty, with a family of one grown up daughter aged 17, and an elder brother of the patient, aged 4; all of them are of normal health and development. The patient, as shewn in the attached photograph, is rather short; he has a rude and rough behaviour, possesses a very shrill voice, unbecoming to his age. He can just talk in a way, but not distinctly. His brother, although 4 years of age, is terribly afraid of him on account of his rough behaviour.

It will be seen from the photograph that the genitalia, penis as well as testes, are highly developed, simulating those of an adult, whilst the pubic region is covered with long and dark hair. It was for this condition that the parents sought advice.

It has been recognised that cortical abnormalities of the suprarenal gland take effect upon the reproductive system, and that premature sexual development often accompanies tumours of the suprarenal gland. In the present case I cannot say what is the cause of this abnormal development; whether it is a pathological condition of the ductless glands, or only a case of hypersecretion of the glands.

My object in publishing the case is to receive suggestions from any of my brother



medical men as to the line of treatment to be adopted.

A HUGE SEBACEOUS CYST OF THE SCALP.

By P. PARAMESWARAN PILLAI, I.M.S.,
Assistant Surgeon, Thuckalay.

AZHAKAN, a low caste Hindu, aged 22 years, was admitted to the district hospital, Mavelikarai in September, 1924, when I was in charge of that hospital.

History.—The patient had had a swelling on his head from birth, which grew bigger in course of time until it reached its present size when it became slightly painful,—vide photograph.

Condition on admission.—There is a tumour about the size of a coconut without its fibrous coat, situated on the top of the head in front. It is soft, round, fluctuating, dull on percussion and irreducible. It can be moved slightly from side to side and from before backwards. There is neither pulsation nor respiratory impulse. There is slight tenderness on pressure and a feeling of heaviness on manipulation. The scalp over the tumour is thin but healthy. Whether there was any opening in the cranium, at or near the anterior fontanelle, could not be definitely

ascertained on account of the large size of the tumour.

Treatment.—Aspiration was performed under aseptic precautions when a thick, yellowish-white



sebaceous matter came out profusely and the tumour was found to have no communication with the interior. Through an incision along the median line the cyst was dissected out. The superabundant scalp was excised and the wound sutured with silkworm gut. The wound healed by first intention. The patient made an uneventful recovery and his appearance is now that of a normal person.

[*Note.*—The history of congenital origin, and its position in the mid line appear to suggest that the cyst may have been a dermoid cyst.—Editor, I.M.G.]

A CASE OF DERMOID CYST OF THE OVARY.

By KAILAS SINGH, L.C.P.S. (Bombay),

King Edward Hospital, Indore, C. I.

A HINDU woman named Mathurabai, aged 40 years, a Kunbi by caste, resident of Soada village in Khandesh, was admitted to the King Edward Hospital, Indore, on the 4th August, 1925.

She complained of swelling of the abdomen, difficulty in breathing on exertion, loss of appetite, and constipation.

Personal History.—Married 25 years previously. She had had two children. Both labours were normal. The last child was ten years old, i.e., she gave birth to this child when she was 30 years old. The menses were regular,

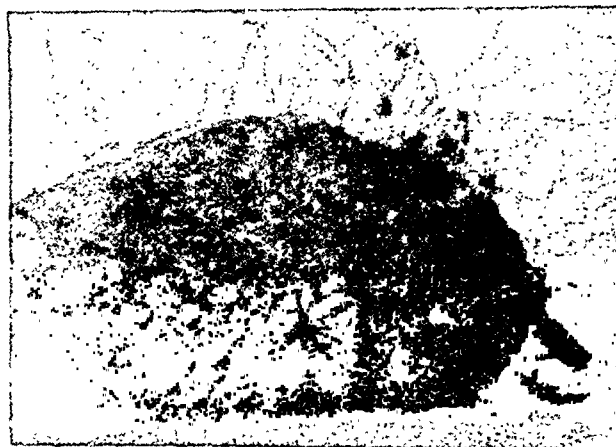
but for the last year there had been scanty menstruation. She was emaciated also.

History of the present condition.—One and a half years before the patient noticed a swelling in the right iliac region which was about the size of a small lemon. The swelling went on gradually increasing in size. There was no special complaint other than the swelling.

Present condition.—General emaciation present.

Abdomen.—There was generalised abdominal swelling, the left half of the epigastric region being more prominent. The consistency of the tumour varied in different places. It was hard in some places, in others soft and obviously cystic to the feel. It was tender at its most prominent part in the epigastrium. It could be moved from side to side. The surface of the tumour was smooth and regular.

The whole of the abdomen, except the extreme left flank and the right lumbar and iliac regions was dull on percussion.



On vaginal examination the uterus was a little backward and displaced to the left side and situated a little higher up than normal. Other systems normal.

The case was diagnosed as cyst of the right ovary and operation was performed under chloroform. As the tumour was very big, some of the fluid was let out first and then the tumour was removed. The fluid which came out was brownish yellow in colour, jelly-like and greasy in consistency. The fluid was 25 lbs. in quantity. The cyst proved to be one of the right ovary. To our surprise in the middle of the operation a bunch of hair about the size of an orange came out from inside the cyst.

The cyst was irregular in shape; more or less circular in outline. It weighed 38 lbs. Its external surface was shiny white, showing distinct loculations. There were no adhesions and no pedicle. In its interior were numerous loculations of varying size. Five of them were filled with a thick, yellow, semi-solid sebaceous matter and some hair. Other

loculi contained greasy pseudo-mucinous material. One of the latter loculi contained isolated matter together with a lump of hair about the size of an orange.

Points of interest about the case are:—

(1) The rarity of dermoid cysts of the ovary.

(2) They rarely attain such a large size.

The usual treatment of a post-operative abdominal wound was carried out and the patient made an uninterrupted recovery and was discharged cured on the 20th day.

The big mass of hair which came out from the inside of the cyst is shown in the photograph.

I have to thank Dr. S. K. Mukerjee, M.B., (Cal.), for helping me in getting this photograph, also to thank Lieut.-Col J. R. J. Tyrrell, M.B., I.M.S., for permission to publish notes on this case.

AN UNUSUAL CASE OF EXTRA-UTERINE GESTATION.

By H. CHAND,

CAPTAIN, I.M.S.,

Civil Surgeon, Kangra.

A HINDU female, aged 30 years, was sent to me by a lady working in the Canadian Mission Hospital, Kangra, for operative treatment:—

The patient was admitted to the Civil Hospital, Dharmasala, on 5th June, 1925.

Previous history.—The patient was a multipara and gave a history of previous normal pregnancies.

History of Present Illness.—About 5 years ago she became pregnant and pregnancy continued to full term; but no child was born. After a year and five months a sinus appeared near the umbilicus from which began to exude pus and later on pieces of bone. This went on till her admission to the hospital.

Condition on Admission.—There was a sinus near the umbilicus discharging extremely offensive putrefactive matter. A distinct swelling was visible between the pubes and the umbilicus. On exploring with a probe bones could be distinctly felt.

On palpation a swelling of the size of a small water-melon was felt, containing several pieces of bones. The patient's general health was fairly good and she did not show any rise of temperature.

Treatment.—On 6th June, 1925, under chloroform an incision was made over the swelling extending from the pubes to the umbilicus. Various bones of the skull, ribs, vertebrae, etc., were removed from the cavity. These bones were macerated and no fleshy part of the foetus was found. The cavity was entirely shut off from the general abdominal cavity. Coils of intestines could be seen behind separated by a very thin membrane. The

Assistant Surgeon examined the patient *per vaginam* at the time of operation and found the uterus not enlarged and entirely separate from the cavity containing the remnants of the foetus. The os uteri was semi-dilated but no finger could be introduced into the cervical canal. The wound was sutured and drainage tube inserted. The patient made a good recovery and was discharged from the hospital on 5th July, 1925, as cured.

Features of interest.

(1) The patient obviously did not suffer from any inconvenience apart from the very offensive discharge, as she did not seek medical aid for such a long time. She showed no signs or symptoms of general sepsis.

(2) Complete separation of the cavity containing the foetus from the general abdominal cavity and the generative organs.

(3) Putrefaction of all the fleshy portions of the foetus and their discharge through the sinus.

A CASE OF MYOMECTOMY.

By NALHADA PRASAD SHRIVASTAVA, L.M.S.,

M.B., B.S.,

Civil Surgeon, Seoni.

A WOMAN aged about 35 years, was admitted to the Seoni Main Hospital on 3rd January, 1925, for enlargement of the abdomen and bleeding from the vagina. The patient was married and a multipara. She had a history of excessive bleeding at each menstrual period for several years previous to the abdominal enlargement, anemia was pronounced, and the pulse rate was 116. Intermenstrual bleeding (metrorrhagia) had been in progress for about a year. The patient first noticed a tumour about the middle of the abdomen and at the level of upper border of the pubic bone. It had increased in size for about a year till it assumed the size of a child's head. There was no disturbance in micturition and no pain or pressure symptoms were complained of. A sense of heaviness in locomotion and after taking meals was the only symptom referable to the tumour directly. Profuse bleeding, general emaciation and progressive weakness were the chief complaints for which relief was sought.

Examination.—Abdominal inspection and palpation revealed a globular tumour in the mid-line of the abdomen extending to about 2 in. above the navel and impacted in the pelvic cavity. Its mobility was strictly limited. The tumour was smooth and uniform in feeling and hard in consistence, in remarkable contrast to an ovarian cyst. Percussion elicited a dull note over the tumour mass and the area of dullness was constant, irrespective of change of decubitus. On auscultation no sounds were heard.

Vaginal examination showed that the os was tilted upwards and forwards and was so closely jammed against the symphysis pubis that palpation was extremely difficult and no uterine sound could be passed. The uterine fundus which was retroverted was felt

posteriorly at a high level and the pelvic cavity felt filled up by the tumour mass.

The bladder was catheterised and showed lateral displacement to the right. The urethra was apparently elongated.

Diagnosis.—The differential diagnosis lay between (1) Pregnancy, (2) Ovarian cyst, (3) Broad ligamentous growth, (4) Malignant growth of the bladder, rectum or pelvic floor.

The duration of the growth, absence of uterine souffle, of foetal heart sounds and of foetal movements, the protracted and profuse bleeding, absence of uterine pains and of changes in the breasts easily eliminated pregnancy.

The consistency of the tumour, history of bleeding, restricted mobility and mid-line position of the mass eliminated ovarian cyst.

The mid-line position, unimpaired functions of the bladder and rectum and absence of pain and pressure phenomena eliminated the other possible conditions.

The diagnosis thus established itself as a "uterine tumour—probably myoma."

Operation.—On 10th January 1925 the abdomen was opened after a good deal of deliberation as the woman by virtue of protracted bleeding was a bad surgical risk.

A vertical incision was made from above the umbilicus to below the upper margin of the symphysis pubis, the tumour exposed, the intestines protected by abdominal towels, and the uterus with the tumour extruded through the wound as far as practicable. The round ligaments were found elongated and hypertrophied, the left ovary cystic and the uterine arteries hypertrophied. The uterus with the tumour presented a smooth and globular outline and the different parts of the uterus were impossible to discern.

A transverse incision was made across the most prominent part of the tumour along its anterior surface. On cutting through the capsule which was about 3½ in. thick a spherical tumour could be easily shelled out leaving a hollow shell and a globular mass attached to the lower end of the shell. On careful examination the lower globular mass proved to be a uterus of practically normal dimensions, and no other tumours could be palpated in its substance. Thus the tumour removed was a *suprafundal, single, subserous myoma*. The uterus was left undisturbed, the shell was excised to the utmost and the raw fundal area was closed by mattress sutures, bleeding carefully stopped, and the round ligaments left undisturbed; the left cystic ovary was excised and the abdomen closed after toilet of the peritoneum and leaving a pint and a half of warm normal saline in the abdominal cavity. The patient was placed in Fowler's position and made an uneventful recovery. The uterine bleeding stopped, the wound healed by first intention and the patient was discharged cured on 3rd February 1925.

The interesting features of the case are:—

- (1) Single myoma—as a rule they are multiple.
- (2) Protracted and profuse bleeding, which is rare in a subserous type of myoma.
- (3) Non-invasion of the uterine substance.
- (4) Non-disturbance of bladder functions though the viscus was laterally displaced.
- (5) Absence of pressure symptoms from pressure on the lumbar and sacral plexuses or the rectum.
- (6) Sterility of the patient though the uterine cavity was not invaded.
- (7) The existence of the tumour without any impairment of general health except in the late stages when bleeding became frequent and profuse.

A CASE OF SEPTIC ABORTION COMPLICATED BY *BACILLUS COLI* INFECTION.

By D. N. BUCHIA, I.M.S. (Bombay),

Late House Surgeon, Parsi Lying-in Hospital, Bombay.

THE publication on p. 295 of the issue of the *Indian Medical Gazette* for June 1925, of Dr. Wrench's case tempts me to describe a case recently under my treatment suffering from septic abortion, complicated by an infection with *Bacillus coli*.

Mrs. S. M., a Parsi lady, aged 27, multipara, was four months pregnant when sudden hæmorrhage set in on the night of the 14th May, 1925. In order to prevent abortion a full dose of morphia was given, she was put on a sedative mixture, and complete rest was ordered with a low diet.

Four days later she passed a blood clot with no accompanying pain or restlessness on the 18th May, and a four months' foetus was found lying in the vagina together with clots. As post-partum bleeding continued a further examination was made and a small piece of chorion removed with difficulty. She was now given a quinine and ergot mixture and the case left to nature.

The next morning a piece of placenta and membranes was passed naturally and her condition was good. On the third day after the abortion, however, fever ensued with a temperature of 101°F., pulse 120, headache, pain in the hypogastrium and restlessness. Intra-uterine examination shewed that there was still a small piece of placenta firmly adherent to the fundus uteri as if hanging on a tendon. Attempts to detach it failed, and the same afternoon there was mild shivering with a temperature of 102°F. A second attempt to remove it failed the next day, and her temperature rose to 106°F. with a prolonged rigor. A consultant was now called in who succeeded in detaching the piece of placenta, piecemeal, and only with great difficulty. No intra-uterine douche was given as he was opposed to such a procedure. A further rigor with a temperature of 104.4° ensued.

The next morning her condition was bad; she looked pale and puffy, temperature 103.4°; pulse 120; and the lochia quite suppressed. Poly-valent antistreptococcal serum was given, 100 c.c. in divided doses, each of 20 c.c. twice a day. An intracervical swab was taken and an autogenous streptococcal vaccine prepared, and injections of it commenced. After the fourth injection of vaccine the temperature became normal, pulse 96, and her condition was good.

Four days later, however, the temperature rose to 100.4° with pain and burning on micturition. The urine was withdrawn by catheter and yielded a pure culture of *B. coli*. An autogenous vaccine was prepared, and injections given every fourth day, together with an alkaline mixture and urinary antiseptics by the mouth. After seven injections recovery ensued and she is now in good health.

The interesting features of the case are:—
 (1) The very firmly adherent fibrous placental attachment, probably resulting from her previous chronic endometritis. (2) The repeated rigors with high fever. (3) A relatively low pulse rate in proportion to the high temperatures registered. (4) The urinary infection with *B. coli* as a sequel to the septic infection of the uterus. (5) Her recovery, although in such a grave condition, on autogenous vaccine therapy. I am of opinion that in such cases there can be no hard and fast rules, but that each case should be treated individually on its own merits. Even had the pregnancy proceeded to full term, she would probably have had to pass through a similar ordeal.

A CASE OF MADURA FOOT TREATED BY CHEMOTHERAPY. APPARENT CURE.

By F. J. PALMER, F.R.C.S.I.,

LIEUT.-COLONEL, R.A.M.C. (Retired).

As Madura foot has been hitherto regarded as incurable except by amputation, the following case may be of interest, and is published in the hope that those whose opportunities of meeting this disease are greater than mine may be induced to test this treatment. Madura foot would appear to be rare in Cachar, and the case reported is the second I have seen in three years. The first refused amputation and died some four months after being first seen.

T—D—an elderly Indian, appeared for treatment on 1st April 1925. The right foot was greatly enlarged, with swelling extending above the ankle, presenting a typical appearance, and discharging a watery, purulent, and foul-smelling fluid through several openings in the foot and sole, the largest of which was situated close to the insertion of the tendo Achillis. Pain on movement was marked, and the patient was carried to hospital. He also exhibited various evidences of old standing, half spontaneously arrested leprosy. A diagnosis of Madura foot in a chronic leper was made. No albumin was present in the urine.

As amputation was advised and rejected, it was decided to treat the case on the same lines as the writer's treatment of leprosy, and 3 grains of bismuth sodium tartrate (Burroughs & Wellcome) were given intravenously.

14-4-25. One discharging sinus drying up and almost closed. No difference at heel, where a slough can be seen at edge of the large sinus mentioned, the odour from which is still offensive. Urine shows a faint trace of albumin. Given 2½ grains bismuth tartrate intravenously.

A couple of dark brown, almost black, typical grains were seen in the discharge to-day and set aside for microscopic examination, but when called to an urgent case were, unfortunately, mislaid in my absence.

Three grains of bismuth tartrate were given intravenously on 9-5-25, 29-5-25, and 14-6-25. The sinuses closed, and pain was less marked. On the latter date,

a sinus which had closed reopened slightly. No albumin in the urine.

22-6-25. Grains 2½ bismuth tartrate intravenously.

30-6-25. Walking on foot a little. No albumin in urine.

10-7-25. Re-opened sinus near heel not completely healed. No albumin. Grains 4 bismuth tartrate intravenously. Patient was given ten one-grain pills of copper citrate, one to be taken daily before next visit. Three days interval to elapse after injection before commencing copper orally.

25-7-25. Sinuses closed. Swelling less. Walking a little. Grains 1½ of copper citrate intravenously. Ten grains of copper citrate in one-grain pills daily, to be taken as before.

11-8-25. Foot smaller, sinuses closed, skin wrinkling. Grains 1½ copper citrate intravenously; and ten grains of copper citrate in one-grain doses daily, as before.

25-8-25. Foot now nearly the same size as the other. No albumin. Grains 1½ copper citrate intravenously, followed by one-grain pills daily for ten days.

11-9-25. Tissue of sole now loose and flapping about. Grains 1½ copper citrate intravenously and one grain orally for ten days, after three days interval.

13-10-25. Foot almost the same size as the other and with all sinuses soundly healed. Can now walk a mile and feels much stronger. No anemia. Grains 3½ bismuth tartrate intravenously.

3-11-25. Grains 3 bismuth tartrate intravenously.

20-11-25. Shown at divisional meeting of Assam Branch, B. M. A. The Madura foot is apparently cured, but a swollen leprous toe remains. Ankle of normal contour. Can now walk about two miles.

It is to be regretted that the two diseases were here concomitant, but I have no doubt of the diagnosis as my acquaintance with leprosy and its manifestations is extensive. The discharge from the sinuses was microscopically examined on several occasions before they closed, and showed small globules staining deeply with gentian violet or methylene blue, but in which no structure could be distinguished. I am not sufficiently acquainted with the microscopic appearance of Madura foot discharge to know whether these are characteristic of the disease, but would surmise that these globules represent an early stage of development of the granules, which are such a characteristic feature of the disease.

The granules were only seen upon the one occasion noted.

It is somewhat difficult to appraise the effect of the two drugs used. The bismuth tartrate undoubtedly exerted a very powerful effect at first, but a slight re-opening of a sinus suggested that it might be somewhat losing its effect, though this might only have been the result of reaction. I therefore changed to copper citrate, which also appeared to have considerable effect.

The reactions that occurred in some of the leprous areas have not been touched on here.

It is hoped that others will try a method of treatment which appears most promising in a hitherto incurable disease.

A CASE OF INCIPIENT HEART-BLOCK.

By B. P. BANNERJI, M.B.,

285, Kalighat Road, Calcutta.

ON the 10th April 1925, about 5-30 p.m. I was called to attend a patient who had fainted. He was then just convalescent after an attack of chicken-pox which took place at Purnea, and had arrived in Calcutta the previous night.

Immediately before the fit he had been asleep. On being aroused by his brother at dinner time, he suddenly got up, gave a short scream and fell on his bed unconscious. Immediately afterwards I found him quite unconscious on his bed, and at first could not rouse him. His eyes were rolled upwards and deviated to the right, the pupils dilated but sluggishly reacting to light, and the corneal reflex almost lost. His face was a little cyanosed, and his breathing deep, sighing and almost stertorous.

After a few minutes epileptiform manifestations appeared, the limbs becoming stiff, with spasmodic contractions of the flexor muscles. The pulse was slow, 45 per minute, but the heart sounds normal.

The attack lasted nearly an hour, after which the patient gradually recovered, though exhausted; he complained of aching and pains all over.

The next day at about the same hour I was again called in to see the patient who had had a similar syncopal attack with convulsive movements, but this time lasting for a shorter time. His pulse varied from 45 to 50 per minute, whilst on auscultation extra-systoles could be elicited, though the cardiac sounds were normal.

Since then the patient has been in good general health, but with a tendency to similar syncopal attacks each evening at about the same hour. Owing to his nervous state, I had to keep a careful watch on him every evening for five days consecutively, the attacks however becoming more and more transient, and the patient gradually recovering, partly through psycho-therapy, partly by dietetics and eliminatives.

Ordinarily the patient is a stout, healthy looking man of about 27 years of age, sober in habits and newly married. About two years ago he had transient fainting fits on two occasions without any attributable cause. His father is subject to hysterical attacks, and one of his uncles had Stoke-Adams' syndrome some years ago, so there is some evidence of family predisposition.

The clinical picture of the case is very suggestive of block at the auriculo-ventricular bundle of Hiss which obstructs some of the auricular impulses during their transmission to the ventricle, causing bradycardia; whilst the syncopal attacks may be attributed to partial cerebral circulatory deficiency, but I cannot explain the occurrence of the attack at about the same hour every evening for several days. The subsequent history of the patient is uneventful and he is now in good health.

A PRELIMINARY NOTE ON TWO CASES OF ASTHMA TREATED WITH AN AUTOGENOUS VACCINE PREPARED FROM A GRAM-NEGATIVE BACILLUS ISOLATED FROM THE SPUTUM DURING THE ATTACK.

By A. J. NORONHA, I.M.S., M.D.,
Lecturer in Pathology and Bacteriology, B. J. Medical
School, Poona, and Pathologist to the Sassoon
Hospital, Poona.

THE writer does not at present wish to claim any specificity, causative or exciting, for the organism isolated until more cases of this nature are found. The results obtained however are so striking that a short note at this juncture will not be out of place.

Case 1.—Mr. V., L.C.P.S., then a student of the B. J. Medical School was admitted to the medical wards under Major A. G. Coullie, I.M.S. He had occasional attacks of mild asthma but his main complaint was breathlessness and cough. Major Coullie suspected early tuberculosis and granted the patient long leave. Before discharging him, however, he asked me to see if a vaccine would do him good as repeated examination for tubercle bacilli had proved negative. Frequent examination of the sputum showed the presence of a Gram-negative bacillus, non-motile, and not conforming in character to any known pathogenic organism. I was able to discharge Mr. V. quite free from his cough and bronchitis and from the asthmatic attacks to which he was subject. He has since passed his examination and has seen me several times, being now quite free from any symptoms.

Case 2.—Mr. G., sent to me for treatment by Major Garpurey, I.M.S., Civil Surgeon, Sholapur. I obtained a similar organism in this man's sputum. He had typical attacks of asthma and all treatment had failed to afford relief. Major Garpurey writes to me as follows about the case:—

".....I saw G. lately and he is greatly improved, has put on a stone in weight, and looks very fit. In this case at any rate... the results are very good."

These two cases are published for what they are worth, without any comment beyond the fact that the same organism was obtained in both cases.

A FATAL RESULT ASSOCIATED WITH FILARIAL INFECTION.

By B. N. GUPTA, O.B.E. (Military), M.B.,
Pathologist, Howrah General Hospital.

It would be of interest to obtain comments on the following case history:—

Ratnakar Pande, an Indian male, 25 years of age, was admitted to the Howrah General Hospital suffering from fever and jaundice. The fever was stated to be of five days'

duration and of intermittent type. The patient, on admission, was found to be unconscious, with icteroid conjunctivæ and pupils widely dilated. The extremities were cold; temperature 97°F.; pulse 68, soft and feeble; and respiration rate 20 per minute.

Nothing abnormal could be detected in the heart and lungs. The liver and spleen were not enlarged. On examination no albumin or sugar was detected in a specimen of the urine withdrawn by catheter. A blood film taken on the morning of his admission and stained did not shew any malarial parasites, but shewed microfilarie present. The film shewed leucocytosis, but no total count was done. A thick drop of blood, examined in the fresh state, shewed innumerable microfilarie.

The patient was treated for collapse, but did not revive, and died the same evening. A post-mortem examination was refused by his relatives.

The case is of interest from several points:—

(1) Filarial septicæmia not being known, whether there was some other septicæmic condition present, and the microfilarie simply came out into the peripheral circulation in the unconscious patient, as they would have done if he was sleeping.

(2) Or whether the case was one of infection with *Filaria diurna* with a concomitant septicæmic condition.

My thanks are due to the Surgeon Superintendent, Howrah General Hospital, for kindly allowing me to publish the notes on this case.

A CASE RESEMBLING INFANTILE CIRRHOSIS OF THE LIVER IN WHICH RECOVERY TOOK PLACE.

By N. GOPALAN, I.M.F.,

Sub-Assistant Surgeon, Municipal Dispensary,
Manambuchavady, Tanjore.

INFANTILE cirrhosis of the liver is a characteristic disease, occurring mostly among Hindu infants in Bengal and South India. It is not easily amenable to treatment and most of the cases rapidly terminate fatally. The following account is of a case which was noted by me, in which the infant recovered completely.

A male baby, aged about a year and a half, was brought to me two months ago, by a neighbour and friend of mine, a retired station master, with enlargement of the liver and spleen. The liver was found to be enlarged to three fingers' breadth below the costal arch, and the spleen was distinctly palpable. I was told that the child was getting thinner, but the abdomen more and more prominent. The child had become peevish in temper after the onset of the illness.

I was of opinion that the disease was fairly advanced and I plainly told my friend that the disease was not easily curable. The child was shown to many well known allopathic doctors, who were of the same opinion as myself as regards prognosis. The child was then taken away to Pudukotah to be placed under the treatment of a hydropathic doctor there. I saw the child a few days ago, and am glad to report that he has been almost completely cured.

The treatment adopted was as follows:—

The baby was placed every day both morning and evening in a tub of cold water, immersed as far as the chest, and the whole abdomen was rubbed gently with a wet towel for not less than 20 minutes. Whenever the child was constipated, an enema of half a pint of cold water was given. The diet was boiled sago in a semi-solid form, and Glaxo, at regular intervals. This process went on for a month and a half.

When the child was brought to me a few days ago, I was struck with the remarkable improvement in the health of the baby. The liver has receded and the spleen is not palpable. The child is now quite healthy.

I have treated a large number of similar cases with little or no success, and I may be permitted to state that I myself lost a daughter about 2 years old from this dire disease. In South India a large number of children die from it every year, contributing a fair share to the already high rate of infant mortality.

I request my professional brethren to try the hydropathic treatment, and report the results through the columns of your valuable journal.

[Note.—We have shewn Dr. Gopalan's notes to Dr. Sivapada Bhattacharji, Assistant Professor of Tropical Medicine, Calcutta School of Tropical Medicine, who has had considerable experience of the disease as seen in Calcutta. He remarks:—"Clinically the case appears to have been one of infantile cirrhosis, although there is no absolute criterion by which the diagnosis could be clinched, otherwise than at autopsy. In the early stage of the disease there is hypertrophy and an enlarged liver, but, as the case goes on, the liver gradually contracts, and diminution in the size of the liver is not a criterion of cure in all cases. The duration of the disease varies from 6 months to 2 years. The advanced condition of such cases shews a contracted liver, an enlarged spleen, jaundice, and a gradual development of ascites.

It is a curious fact that a change of environment—and in some cases even a change of house alone—may result in cure of the condition. In the present case reported on abdominal massage, a change of environment and a change of diet appear to have been the factors chiefly responsible for cure; the

hydrotherapy may have had but little to do with it."—Editor, *I.M.G.*]

A CASE OF PLEURAL EFFUSION WITH ABDOMINAL SYMPTOMS.

By M. G. RAMACHANDRA ROW, M.B., C.M.,

Chief Medical Officer, Pudukotah State.

I WAS called in early last June to attend a widow, by caste a *Chetty*, some 42 years of age, whom I found sitting with her legs extended and her back against a wall, struggling for breath. She was very pale and anæmic, and of thin and tall stature.

Her history was that she had gone on a pilgrimage some two months previously, and had had fever and cough subsequently. A smooth, painful swelling had been noticed in the epigastrium which had gone on increasing in size. She had been treated by various doctors, had had attacks of vomiting which appeared to have reduced the epigastric swelling, but for the previous 15 days there had been acute dyspnoea.

On examination the temperature was 104°F., pulse 135, respiration laboured and 35 per minute. A smooth bulging swelling was present under the left costal arch. The left side of the chest moved less freely than did the right. Percussion and auscultation shewed an enormous pleural effusion in the left side of the chest, pushing down the diaphragm and bulging in the left epigastrium. On cross-questioning she admitted to a history of stitch in the side at the commencement of the illness.

A first aspiration brought away some 80 ozs. of a straw-coloured fluid. A second, a week later, undertaken as there was still considerable dullness with impairment of the breath sounds, discovered no fluid. For some two and a half months she was treated with complete rest, tincture of iodine externally to the chest, a course of sodium morrhuate injections, colossal calcium, and other drugs. The diet contained broths and soups, milk, oranges and port wine.

The interesting feature of the case is that the patient referred all her symptoms to the abdomen and to the swelling in the epigastrium.

INTRAVENOUS IODINE IN PULMONARY DISEASE.

By V. J. LOPEZ,

Medical Officer, Alipuram Jail, Bellary.

As there are at present a number of advocates of intravenous iodine therapy, perhaps the following summary of a few cases treated by me in the Alipuram Central Jail from April 1924 to the end of July 1925, may be of interest, particularly so in view of Colonel Jeudwine's experience with this method of treatment.

I have been using iodine intravenously since 1922 in a variety of septic conditions with fairly satisfactory results, but for the present I shall confine myself to its use in pulmonary complaints.

Diseases.	Total admissions.	Treated with iodine intravenously.	Deaths.	Treated without iodine.	Deaths.
Pulmonary tuberculosis	81	61	13	20	15
Pleurisy with effusion..	27	9	0	18	0
Lobar pneumonia ..	38	12	0	26	4
Influenzal pneumonia ..	16	16	2	..	..

All the tubercular cases treated were unmistakable cases, no incipient or doubtful cases being included in this summary. Out of a total of 81 cases admitted to hospital 22 were transferred to other jails, 18 after a course of intravenous iodine and 4 prior to this. Later reports show that the latter 4 all died, whilst among the former only 3 cases proved fatal, the others making good progress. These are also included in the above table. Out of the 20 cases that did not receive intravenous iodine treatment, 15 died and the remaining 5 were released from jail and their further progress is not known.

Of the 33 "iodine" cases now remaining in hospital in this jail, 26 have so improved that to all intents and purposes they are cured. All symptoms have disappeared and it would seem that they are in fitter condition than they have ever been since admission to this jail about 4 years ago, the increase in weight varying from 15 to 35 lbs. Here I must mention that these men as well as those that did not receive iodine treatment had also a regular course of sodium morrhuate injections. The diet on admission to hospital was mainly of milk. Later, if digestion was not too impaired, eggs and soup were added. After the temperature had dropped to normal and the patient was allowed out of bed he was given "full diet" to which extras, such as milk, eggs, curds, butter, bread, soup, etc., were gradually added carefully.

Amongst the lobar pneumonia, pleurisy and influenzal pneumonia cases treated, only the very severe ones had intravenous iodine. In all these cases a routine examination of blood smears was carried out to eliminate the possibility of a malarial complication.

From amongst the milder cases of pleurisy two later developed pulmonary tuberculosis, but from amongst those that received intravenous iodine there have so far been no re-admissions.

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Influenzal pneumonia ..	16	16	2

All the tubercular cases treated were unmistakable cases, no incipient or doubtful cases being included in this summary. Out of a total of 81 cases admitted to hospital 22 were transferred to other jails, 18 after a course of intravenous iodine and 4 prior to this. Later reports show that the latter 4 all died, whilst among the former only 3 cases proved fatal, the others making good progress. These are also included in the above table. Out of the 20 cases that did not receive intravenous iodine treatment, 15 died and the remaining 5 were released from jail and their further progress is not known.

Of the 33 "iodine" cases now remaining in hospital in this jail, 26 have so improved that to all intents and purposes they are cured. All symptoms have disappeared and it would seem that they are in fitter condition than they have ever been since admission to this jail about 4 years ago, the increase in weight varying from 15 to 35 lbs. Here I must mention that these men as well as those that did not receive iodine treatment had also a regular course of sodium morrhuate injections. The diet on admission to hospital was mainly of milk. Later, if digestion was not too impaired, eggs and soup were added. After the temperature had dropped to normal and the patient was allowed out of bed he was given "full diet" to which extras, such as milk, eggs, curds, butter, bread, soup, etc., were gradually added carefully.

Amongst the lobar pneumonia, pleurisy and influenzal pneumonia cases treated, only the very severe ones had intravenous iodine. In all these cases a routine examination of blood smears was carried out to eliminate the possibility of a malarial complication.

From amongst the milder cases of pleurisy two later developed pulmonary tuberculosis, but from amongst those that received intravenous iodine there have so far been no re-admissions.

Dosage and Preparation of Iodine.—A watery solution of $\frac{1}{2}$ to 1 grain of iodine with twice this quantity of potassium iodide in 10 c.c. of sterile distilled water has been the usual dose. None of the cases reported above received more than one grain of iodine at a dose. The B. P. tincture was never used.

Intervals.—In the case of tubercular patients injections were given every fourth day. Six injections were reckoned as a "course." In the majority of cases one course was all that was necessary; nine of the sixty-one cases treated required a second course after an interval of 2 to 3 weeks and 3 cases had 3 such courses.

The cases of pneumonia, etc., treated received the injections every day or every second day according to the severity of the case. Three injections as a rule sufficed, the dose always being $\frac{1}{2}$ grain of iodine.

Technique.—This is the same as for other intravenous injections, choosing a fairly large vein at the bend of the elbow or in the forearm, and using a 10 c.c. all glass or "Record" syringe. A really sharp pointed needle is a necessity as a very large proportion of the difficulty and failures encountered is due to blunt needles.

The injection of the fluid after the needle has entered the vein should be slow, as in the case of other intravenous injections. Pain is not often complained of.

Most of my cases were bedridden patients but a few that were up and about were kept in bed for a few hours after the injection. No special preparation of patients prior to injection was found necessary.

Reaction and Complications.—The percentage of cases that show any reaction at all is very small. Out of about 200 patients who had intravenous iodine during the last 18 months only five had reactions (2 of pulmonary tuberculosis, 2 of pneumonia and 1 of syphilitic disease of the testis); viz., a rigor within $\frac{1}{2}$ to 1 hour of injection, with a rise of temperature varying from 101° to 103° . This generally fell to normal within 2 to 3 hours. No special treatment was indicated. Rest in bed and a couple of blankets were all that was found necessary. I am unable to ascribe any reason for this reaction as all the injections were given under similar conditions. Idiosyncrasy probably plays an important part, as these men had the same types of reaction after every succeeding injection.

I have so far had no cases of iodism in spite of the fact that the intervals between injections were comparatively short.

I have had no cases of thrombosis worth mentioning and have been able to use the same vein repeatedly. This may be due to the fact that when dealing with male adults I have been fortunate in getting fairly large and prominent veins. There is a belief in certain quarters that use of the B. P. tincture instead of a watery solu-

tion tends to bring about thrombosis, but I have had no personal experience of this.

CASES OF FOREIGN BODIES IN THE NOSE AND EAR.

By K. N. PRADHAN, I.M.S. (Bombay),
Mayo Hospital, Nagpur.

Case 1.—A male child, aged 4 years, was brought with the following history:—Denied all history of having put a foreign body into the nose, but had suffered from a purulent nasal discharge for the past four or six months. Occasionally there was bleeding from the nose, but no offensive odour. Swelling on the left side and in the region of the left antrum had been noticed. Treatment with hot fomentations, hydrogen peroxide and other irrigations had effected no relief. Examination with the nasal speculum shewed both antra quite clear. The pupillary reflex could not be seen, but a definite dark shadow was seen on the floor of the left nostril. With a probe a tamarind seed in rather a crushed condition was evacuated. There was smart hæmorrhage after its removal, but this stopped on sponging the child's face with cold water. Bare bone could be felt in the floor of the nose, but the condition cleared up well on a simple liquid paraffin spray. *Comment:* in any case of unilateral purulent nasal discharge in the case of a child, think of the possibility of foreign body in the nose.

Cases 2 and 3.—Two patients from different families, one a boy of 5, the other a girl of 4, came complaining of offensive, purulent discharge from the right nostril. There was no history of bleeding or of swelling of the face. Also no history of the insertion of a foreign body. From both, however, pieces of betel nut were extracted. In both cases transillumination shewed a dark spot in the floor of the nostril, but the pupillary reflex was not seen.

Case 4.—An elderly compounder was standing on a rainy evening near a powerful electric lamp around which many moths had collected. He suddenly felt a peculiarly painful sensation in his ear. The next instant this stopped and then recurred. On being called in I was alarmed to see the agony which he was suffering and his violent shaking of the head. On inserting a speculum I made out a small insect trying to climb up the wall of the tympanum. The membrane appeared to be normal, and a drop of glycerine was instilled. The patient then screamed and the next instant the living insect dropped out of the ear. In its struggles apparently it tried to scratch deeper and deeper into the membrane. The next day there was deafness and inflammation of the whole tympanum; no perforation was seen, but it took a week before the drum became normal again, whilst a serous discharge was present for some days.

Indian Medical Gazette.

FEBRUARY.

THE ALKALOIDS OF CINCHONA.

THE Medical Research Council has just issued a report of the findings of a committee which was appointed in January 1920 for the purpose of investigating the action of the cinchona derivatives on malaria.

The members of the committee were Dr. Andrew Balfour, Lt.-Col. S. P. James, I.M.S. (retd.), Dr. H. H. Dale and, for part of the time, Major H. W. Acton, I.M.S., who had to resign from the committee on his return to India. The reason for the formation of the committee was the publication by Major Acton of evidence which pointed to quinidine and cinchonidine being definitely superior to quinine in the eradication of benign tertian infections. The committee dealt specially with the relative merits of quinidine bisulphate and quinine bisulphate and employed specially purified samples of these drugs. The committee was unable to test the value of the two drugs in bringing about complete cures, as they had not the unique opportunities which Major Acton enjoyed of having a large number of malaria patients under complete control in a non-malarious place. For this reason, their findings are not strictly comparable with those of Major Acton. They claim that their experiments were more satisfactory in one respect than those of Major Acton, in that his patients were men who had relapsed after a previous full course of quinine and that the observed greater efficacy of quinidine might apply only to patients who had previously been treated by quinine, while it might not be applicable to the use of quinidine in the general treatment of malaria.

The findings of the committee were based on observations on the action of the two alkaloids in causing disappearance of the parasites during an acute attack.

Reports were received:

(1) From Colonel Harvey who treated 7 cases of benign tertian malaria with quinine bisulphate, 10 grains for 70 kilogrammes body weight. The drug was dissolved in dilute sulphuric acid, one dose was given before breakfast and one before the evening meal.

Eleven patients were treated with quinidine bisulphate used in the same way. The average time of disappearance of the parasites was 3.1 days in the case of quinine, while it was 4.4 days in the case of quinidine. There

was vomiting in 4 of the patients treated with quinidine, so that it is likely that absorption of the drug was incomplete: hence the observed difference in time of action does not constitute satisfactory evidence.

(2) From the Civil General Hospital Khartoum.—In 27 cases of sub-tertian malaria, no significant difference could be detected between the two drugs. In 19 cases of benign tertian, the disappearance of the parasites took place in 3.5 days with quinine and 4.6 days with quinidine.

(3) From the Public Hospital, Georgetown.—The records show no appreciable difference between the two drugs.

(4) From the Superintendent Medical Officer, Kampala.—The report is not capable of analysis on the same lines as the other reports.

(5) By far the most complete report was received from Dr. Fletcher of the Institute for Medical Research, Kuala Lumpur; 70 patients were thoroughly studied. The results, as stated in tabular form, are decidedly in favour of quinidine.

The average number of doses before absence of trophozoites was

Benign tertian ..	Quinine 4.5 (6 cases)	Quinidine 3.4 (10 cases)
Sub-tertian ..	" 6.6 (13 ")	" 4.3 (12 ")
Mixed tertian ..	" 9.6 (5 ")	" 4.0 (3 ")
Quartan ..	" 8.7 (10 ")	" 9.1 (11 ")

Dr. Fletcher reports that the temperature was not above normal after the 3rd day in the 34 men of the quinine group except in 5, in whom slight rises were seen up to the 5th day.

The results were "even better" in the 36 men of the quinidine group, the temperature not going above normal after the 3rd day except in three quartan cases in which trifling rises were noticed up to the 5th day. The results of treatment with quinidine were regarded by Dr. Fletcher as being "a little better" than those with quinine. No toxic effect of any consequence was noticed in the use of either drug. The response to Mayer's urine test was more constant and marked in the quinidine group than in the quinine group. The average dose of quinidine was 5 grains against 4½ grains of quinine, the difference being due to the fact that the average weight of the quinine patients was half a kilogramme less than that of the quinidine patients.

Dr. Fletcher suggests that the proper dose of quinine does not necessarily vary directly with the body weight, and he appears to imply that quinine was not tested under such favourable conditions as quinidine. Probably this belief accounts for the faintness of the praise which Dr. Fletcher gives to quinidine in his conclusion—that "the immediate effect of quinidine bisulphate in malaria is as good as, or slightly better than, that of quinine bisulphate."

The only really damaging evidence against quinidine is given by its own sponsor Major Acton, who reports several instances of cardiac depression following the use of the drug in ill-nourished patients and two cases of death which might have been caused by its use. The note by the committee on this subject is, "it seems clear that the effect of quinidine on the heart may constitute a real drawback to its employment." The committee find that the reports provide no evidence in favour of Acton's suggestion that the curative actions of these alkaloids are specially different for the different kinds of malarial parasites, and suggests that Acton's own evidence was susceptible of alternative interpretations. Another finding is that quinidine has been shown to have a real value in the treatment of malaria, but "it does not seem probable that the demonstration of its value would, by itself, have a very important practical effect on planting policy". "The addition of the quinidine yield to the quinine yield would somewhat increase the supply of such alkaloids, but probably not to such an extent as to make a big change in the cost of production". The committee suggest that the depressant action of quinidine on the heart muscle may be found to impose a limit on its use as an anti-malarial remedy. The enquiry has had one important result, to depose quinine from the place assigned to it by tradition and usage as the only valuable cinchona alkaloid.

Cinchonidine has been shown by Acton to be of equal value with quinidine; and cinchonine, though ruled out because of its toxicity, may prove to be of value if carefully purified.

The committee are "conscious of the fact that the contribution which they have been able to make to this important question is a small one." The enquiry may not have yielded conclusive results, but it has served to make it clear that further work remains to be done on the cinchona alkaloids. It cannot even be asserted that the findings disprove Acton's contention that quinidine yields a greater proportion of final cures in benign tertian malaria than quinine, and even if it were to be proved that quinidine was specially valuable only in cases which had relapsed after quinine and not in malaria generally, the drug might still be a valuable addition to our weapons of attack in relapsing cases.

The problems which have still to be solved are

(1) What are the special advantages and disadvantages of each of the alkaloids of cinchona against the different malarial parasites in various conditions such as chronicity, previous treatment, etc.?

(2) How can the greatest use be made of existing sources of supply of cinchona bark so as to produce the maximum of effect on malaria?

(3) What should be the planting policy of

India with a view to obtaining the greatest and most effective supply of alkaloids for the future?

We believe that these three questions cannot be answered at the present time in such a way as to command general acceptance. It is of great importance that they should be answered in an authoritative manner; it is not merely medical research workers who are concerned; the chemists, the forestry experts, and the higher executive officers of Government are also interested parties. The health and even the lives of millions of peoples are at stake and it is to be hoped that an enquiry will be instituted which will result in effective action being taken.

Meantime there is no reason for loss of confidence in our existing drugs, in quinine we have an old and tried remedy which, if properly used, continues to give results unequalled by any other drug in the pharmacopœia; "cinchona alkaloid," though a substance of varying composition, has the enormous advantage of cheapness. If it were standardised so as to be reasonably constant in composition and satisfactory in action, it is likely to be very valuable because of its abundance and low cost.

Colonel Gage's contribution to the problem to which reference was made in the last number of the *Gazette* is of great value. In it he refers to the enquiry into the cinchona alkaloids which was made by the Madras Government so long ago as 1886-87. After a test of the alkaloids on about 2,600 patients it was found that sulphate of quinine and sulphate of quinidine were equally effective, sulphate of cinchonidine was nearly as good, and sulphate of cinchonine, though somewhat inferior, was of considerable value. Colonel Gage advocates the use of the combined alkaloids when economy is important.

We hear that the Government of India is making an enquiry into the question of the use of the alkaloids and that Major Sinton is carrying out further investigations at Kasauli, under the same favourable conditions as were available to Major Acton in his Dagshai experiments. It is by an examination of the work which has been done in the past and by supplementing this where necessary by controlled experiments that information will become available on which a sound policy for the future can be based.

Meantime we appear to be swinging back to the position which was arrived at sixty years ago in Madras and it is hard to see how any great improvement can be made on the policy of those days, viz., to make use of all the alkaloids which are of proved value and let none of them be wasted. Even the least effective of the cinchona alkaloids is far more potent against the malarial parasite than the best of the vaunted substitutes.

SPECIAL ARTICLES.

OBSTETRICS AND GYNÆCOLOGY. A REVIEW OF RECENT ADVANCES.*

By V. B. GREEN-ARMYTAGE, M.D., M.R.C.P. (Lond.),
MAJOR, I.M.S.,

*Second Professor of Obstetrics and Gynæcology,
Medical College, Calcutta, and Second Surgeon
to the Eden Hospital.*

THE first quarter of the century has now passed and there are still many conditions in obstetrics and gynæcology, the ætiology or the treatment of which are matters of controversy. However, during recent years the great advances in biochemistry together with the team work of the larger clinics have made clear many problems and have dictated such direct lines of treatment as have a scientific basis.

OBSTETRICS.

Ante-natal care in its fullest meaning is the outstanding feature of recent years, for every hospital or clinic aims at maintaining a properly organised social welfare and clinical outpatient department. The result has been in many clinics that eclampsia has disappeared. Moreover the fetal and maternal mortality has been very greatly reduced thereby.

More and more importance is being attached to the proper feeding of the expectant mother, both as regards the avoidance of toxæmia and the preservation of the health of the fetus in utero. The diet advised is the avoidance of fats and red meat and the taking of a very much larger preponderance of vegetables and fresh fruit, the idea being to maintain the calcium index and give the fullest vitamin content; for it is now well recognised that the toxæmias of the early and later months of pregnancy are in a very large measure due to:—

1. A glycogenic disturbance in the maternal liver which expresses itself in the urine by the presence of ketone bodies, and is the origin of the fatty degenerated liver found at autopsy.

2. The intestinal intoxication factor which is so frequently associated with an unduly excitable sympathetic nervous system. The diet suggested for pregnancy cases in India is as follows:—

Cereals.—Oatmeal porridge or any of the breakfast foods, with milk. Brown or whole-meal bread, toast, rusks, cream crackers, biscuits.

Vegetables.—Any vegetable in any form except fried.

Fruits.—Any fruit either fresh or stewed.

Meat.—Beef, lamb, mutton, veal, not at all or only very occasionally. Pork never. Curry never.

Chicken (avoid duck, goose, game).

Any fish except salmon, mackerel, hilsa.

Eggs.

Croquettes or rissoles if not fried in deep fat.

Soups.—Any soup, thick or clear, but free from fat.

Sweets.—Any jam or jelly, marmalade or honey, but pure honey is best of all.

Milk puddings. Boiled puddings occasionally.

No pastry, no cakes.

Salads.—Any salad, but sparingly of salad dressing.

Fluids.—Water, aerated water, home-made lemonade, orangeade, weak tea, coffee, milk if desired.

No alcohol of any kind.

Butter may be taken if desired, but not in large amounts.

* Note.—In response to our request for assistance in preparing a review of the Indian medical year, 1925, these notes were received from Major Green-Armytage. They form so complete a separate review, however, that we publish the whole as a special article. Major Green-Armytage has recently returned to India after a tour of the principal clinics in England, America and the Continent.—EDITOR, I. M. G.

Cream, fat meats, and any fish fried in deep fat, should be avoided.

Fruits and vegetables must be taken at least twice a day, and meat if at all not more than once every other day.

Mild cheese such as St. Ivel is permissible.

Great stress is laid on the full examination of a primipara after the stoppage of two consecutive periods. If the uterus is retroverted, a simple and useful means of replacing it is to place the patient in bed with the foot of the bed raised and insert a small empty sausage-shaped penny balloon into the rectum and inflate it. The pressure thereof was successful in 18 consecutive cases within six hours thus doing away with troublesome manipulations, possibly under chloroform.

Hyperemesis Gravidarum.—Titus and Givens in America and Professor Watson of Edinburgh, have published very instructive papers on this subject.

The treatment advocated in severe cases consists in:—

(1) The use of carbohydrates to correct the lack of maternal hepatic glycogen.

(2) Rest in bed with sedatives.

(3) Keeping bowels moved daily.

(4) The administration of not less than 3 pints of water per day by mouth and also giving glucose and saline by rectum or vein in order to combat the dehydration factor.

It is imperative that a careful chart should be kept of the fluid intake per day; and this is controlled by accurately measuring the quantity of urine passed per day. The presence of albumen, or a continuously high specific gravity, or a diminishing volume of urine, or an increasing acetone reaction, after 4 or 5 days efficient treatment is looked upon as a matter of grave import demanding, may be urgent, termination of the pregnancy.

The treatment of mild cases is in a large measure a matter of dietetics as described in the Watson diet scheme above but for severe cases perhaps it would be as well to give the detail used by the writer in this country on the above principles. The patient is put to bed in a darkened room with cotton-wool in her ears. A competent nurse is in charge and relatives are kept away. Great care is taken, to keep the mouth and teeth clean and a glycothymoline or permanganate mouthwash is used constantly. A simple enema is given each morning and a rectal saline 9 ounces, glucose 1 ounce is run in slowly t.d.s. At 8 p.m. 15 to 25 grains of veronal in 1 ounce of pure olive oil is given per rectum and the patient sleeps all night. For the first 24 or 35 hours only fruit juice and bicarbonate soda water is given by mouth in frequent sips, if possible up to 60 ounces. A chart of total intake is kept and the daily urine measured and tested daily. As progress occurs more orange juice is given and then clear fresh vegetable or potato soup. Cream cracker biscuits and honey are allowed. Day by day the carbohydrate food allowance is increased until the more liberal dietary, enumerated above is possible, with the addition of skimmed milk, weak milk tea or milk jelly. Progress is oftentimes slow but the total intake of fluids and the total output and analysis of the urine are of the greatest importance. The writer has found as a rule that the veronal per rectum has to be given for a week and then if insomnia is still a worry, that bromides can be substituted or codeine grain $\frac{1}{2}$ given under the skin.

In very severe cases the writer has on several occasions given saline one pint pure glucose 5 drachms into the vein as recommended by Miss Farrar of the Mayo clinic. Pure anhydrous glucose must be used, or rigors may occur.

All cases of hyperemesis do not react to the above method, some cases go steadily down hill despite every effort. The greatest difficulty is to decide when to interfere in these cases. The above rules and data will be successful in 90 per cent of cases but if there is the slightest jaundice, or continued pyrexia, or urinary indication as above, or a peculiar mental muzziness difficult to analyse or describe, the writer would advocate not waiting or delaying till too late for oftentimes these patients sink

into fatal coma before or after delayed therapeutic abortion,—a tragedy and grief to all concerned.

Malaria.

Malaria during pregnancy is a condition which is often mistreated, but it is well to remember that malaria is a potent source of abortion and death of the foetus. Because of these facts only 25 per cent of women go to full term. Therefore malaria during pregnancy should be intensively treated; if this is done death of the foetus or abortions are rare. Practitioners should remember that the common causes of fever during pregnancy are:—

1. A *Bacillus coli* infection.
2. The death of the foetus.
3. A blood infection.
4. Intestinal parasites.

Therefore in every case the urine, the blood and stools should be examined. If conditions in India do not permit of such exhaustive methods, then before giving any quinine the patient should be saturated for 64 hours with 4-hourly doses of:—

Bicarbonate of soda	..	..	1 drachm
Potassium citrate	..	..	1 drachm
In water.			

The advantages of this are:—

1. It inhibits the growth of *B. coli* and possibly diminishes the fever.
2. It enables one to give quinine in lesser doses, e.g. 5 grains three times a day continuously, for quinine in an alkaline plasma acts far more efficiently.

Pernicious or hæmolytic anemia of pregnancy is one of the worst complications possible in India or in England. Many theories have been advanced to explain it, many methods tried to arrest or cure it, but the fact remains that in the majority of cases neither the pathologist nor biochemist has been of any assistance. The writer has records of over 100 cases seen too late, where no known examination of blood, urine or stool was omitted and yet nothing to elucidate the problem was ever forthcoming. In over 80 per cent of cases it was a fatal condition and he was of the opinion that the infarcts so frequently found in the placenta were the cause of this idiopathic anemia. Only early recognition can save these cases but this depends on a well organised and popular ante-natal scheme throughout all big towns and villages; for if in spite of dietetic, hygienic and drug treatment the course of the disease is progressive, the only procedure is to terminate pregnancy, but the difficulty is to choose the best method, for the shock of normal labour, with or without hæmorrhage, frequently kills these patients. The best method would appear to be the direct application of x-rays to the ovum, or foetus, or ovaries. The result is death of the foetus and consequent thrombosis of the utero-placental sinuses; the foetus then acts as a foreign body, and is, as a rule, expelled within 10 days without shock or hæmorrhage, but should natural labour not occur, it can be started and terminated successfully. It is probable that blood transfusion would be most helpful, but this method in India is hedged round by caste or prejudice.

Co-operative research on the whole subject of the anemias of pregnancy is urgently needed. The writer's opinion is that the condition is probably due to some endocrinous disease secondary to intestinal toxæmia, *vide* the recent fine work of McCarrison on nutritional disease. Moreover, it must be borne in mind that the clinical pictures of pregnancy *tetany* and pregnancy anemia are extraordinarily alike, and that in each, the patient has an *alkalosis* and a diminished blood calcium index, associated with or presumably the result of *hypothyroidism* and *hypoparathyroid* secretion.

It would seem therefore that research should be along the lines so brilliantly illuminated by McCarrison and Mellanby,—the clinician and laboratory worker striving hand in hand to elucidate and eventually prevent this disease.

Hepatic and Renal Toxæmia.

There is no condition that gives more anxiety. From time to time, within the last few years certain tests have

been boomed or put forward as the *ultima thule* as to whether a patient was in or out of danger, but alas! time and experience have shown their futility. In America, England and Germany many clinics set no reliance on blood or urine chemistry, and in India experience has led one to adopt the same attitude. For instance the ammonia coefficient is no certain guide, for in cases of moderate severity one may get the highest readings, and in fatal cases readings may be quite low.

Moreover all hepatic function tests have proved equally unreliable. Therefore the clinician has to fall back on older proved methods of examination such as proper measurements and analysis of the urine, blood pressure readings and ophthalmoscopy.

Some authorities believe that we have in the Rosenthal test, combined with consecutive readings of the urea concentration factor, a sounder means for determining therapeutic abortion.

The Stroganoff conservative method of treating *eclampsia* is now almost universal, and certainly the mortality is astounding, being under 10 per cent in his hands, but it must be remembered that in India frequently one does not see cases until very late, therefore in this country it is possible that Cæsarean section will always hold its place, for the most definite indication for Cæsarean section is anuria complicated by repeated fits, even though pelvic conditions are normal.

In connection with *albuminuria* it is most important to realise that we are not justified in assuming that those who have suffered from eclampsia or pre-eclamptic toxæmia may face future pregnancy without fear of any complications, for the writer has observed that the length of time toxæmic symptoms have persisted seems to be a factor in determining the occurrence of permanent renal damage. This observation seems of interest in relation to the management of such patients, either in private practice or in hospital, for such cases are frequently kept in bed and on an eliminative diet for many weeks,—thereby running the risk of permanent renal injury—a very serious matter—for later one may find that the patient is left post-partum with a "leaky kidney." The Johns Hopkins Hospital records show that chronic nephritis follows pre-eclamptic toxæmia in 60 per cent of cases. My own practice therefore is to advise termination of the pregnancy if organic renal change is demonstrated to have lasted, despite treatment, for more than three weeks.

Induction of Therapeutic Abortion.

During the first ten weeks the usual methods till recently have been advocated, but for such conditions as tuberculosis, heart disease and hyperemesis gravidarum vaginal hysterotomy is by far the most successful, for the method is rapid, certain and accompanied by no shock. After the tenth week until the twentieth the choice should be abdominal or vaginal hysterotomy, for by either of these means one can quickly and certainly empty the uterus. After the thirtieth week the cervix is usually soft, therefore the simpler and older methods are probably efficient. It might be as well in this connection to note that during recent years many reports have been published of *chloroform poisoning* following long anaesthesia with this drug during normal and abnormal labour or induction, therefore morphia and scopolamine together with open ether or gas and oxygen should be used if spinal anaesthesia is not possible.

Post-Maturity.

Both in private and hospital practice post-maturity is still far too frequently the cause of disaster to either mother or child. It cannot be too strongly insisted upon that practitioners and nurses should realise that 50 per cent. of post-mature children are born dead, die *in utero*, or are injured, who are born seven days or more after the full expected term. Only intelligent co-operation between the mother, nurse and doctor can reduce the frequency of these disasters for the evidence against permitting post-maturity is overwhelming. The methods

of induction are many. Some prefer the castor-oil-quinine technique which is as follows:—

- At 6-30 a.m., castor oil.
- At 7 " hot tea.
- At 7-30 " hot bath.
- At 8 " very hot vaginal douche.
- At 8-30 " hot enema.
- At 9 " 10 grs. of quinine.
- At 11 " 10 grs. of quinine.
- At 1 p.m., 10 grs. of quinine.

This method has its firm advocates, but is not invariably successful and may have to be repeated 48 hours later.

Others prefer the pituitary technique. Half a c.c. of pituitrin is given intra-muscularly every half hour until pains begin. This method the writer found very popular in Canada.

Some use the penny-balloon method of Lawrie, others the stomach tube means of Fitzgibbon, or Taylor's bag.

Some prefer the bougie method of Krause. If bougies are not available a very excellent substitute can be made by pushing a piece of thin bamboo down the ordinary tubing of a stethoscope, the tubing is elongated and a piece of silk tied at each end as in the figure.

Before induction it is imperative that the practitioner should see that the relation of the foetal head to the pelvis is normal, for if the head overlaps, the death of the mother may occur if it is a contracted pelvis.

One of the greatest dangers of inducing labour and

The New-born Baby.—Louise McIlroy has demonstrated, and her work has been confirmed by many other observers since, that the new-born baby after a long hard labour, especially if forceps have been applied, suffers from shock, and this shock is responsible for the pallor and general respiratory and cardiac asthenia. She advocates that the "shocked infant" should not be violently subjected to artificial respiration but after the mucus has been sucked out of the larynx should be kept absolutely quiet and as warm as possible. Such treatment or negation of treatment demands very great courage and fortitude on the part of the accoucheur, but there are few expert midwives or obstetricians who have not seen a foetus apparently lifeless put aside whilst urgent attention was given to the mother, and only later have found much to their surprise that the baby has recovered and is breathing normally. Possibly the success of the injections of strychnine and brandy or adrenalin which are frequently given to these children has its explanation in combating shock at the same time as raising the blood pressure.

Browne of Edinburgh draws attention to the frequency of neo-natal catarrhal pneumonia as the cause of death. In all probability this pneumonia is secondary to the passage of liquor amnii into the bronchi. This condition is very difficult to diagnose on a physical examination of the lungs but can always be demonstrated post-mortem. Suspicion however should be aroused if rust-coloured froth is seen at the mouth of the recently born baby. Intracranial injury or hæmorrhage can usually be certainly diagnosed by the syndrome of signs:—

- (a) Inability to suck.
- (b) Rigidity of the neck.
- (c) Cyanosis.
- (d) Twitching of the face or other muscles.

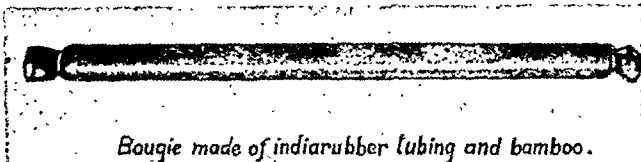
The onset of this syndrome is usually within 24 hours of birth and the prognosis is extremely grave. Repeated lumbar puncture has recently been strongly advocated, but the writer's experience does not favour optimism.

Version.

Dr. Potter of Buffalo has been severely stigmatised for turning and delivering all cases possible by the breech. But in all fairness, one must admit that he has taught the obstetric world one very valuable lesson and that is the technique of "ironing the vagina." The writer watched him doing this on several occasions and there is no question that this should be done by all obstetricians if the perineum is tight or tough, before the application of forceps in a primipara, or the delivery of a breech case. It is done under chloroform using ether soap plentifully and the gloved hand. First two fingers are put in the vagina and then the posterior and lateral margins of the canal are ironed out, that is the sphincter is stretched, then three fingers, then four and then the whole hand is introduced working backwards and forwards with the soap until the mucous membrane, sphincter vaginae, and levator ani are ironed out, that is completely stretched, flattened and dilated and the outlet patulous. The whole manoeuvre takes 10 to 15 minutes. By such means no rupture is likely and the writer saw him deliver a 10-lb. breech baby from a primipara without any laceration or trouble.

Version used to be advocated for minor pelvic contractions when the foetus was not large, but to-day version is rarely done except there be hæmorrhage, for whereas in a vertex presentation Nature slowly moulds the foetal skull, after version the moulding of a normally sized foetal head has to take place in the course of a few minutes, with the often consequent result of paralyses or cerebral injuries.

The practitioner in India is frequently faced with the urgent problem of dealing with hæmorrhage from



Bougie made of indiarubber tubing and bamboo.

certainly one of the greatest bugbears of the obstetrician is *premature rupture of the membranes*. This spells a long dry labour and danger to the child and mother, for as a rule, it indicates that the head of the child is not flexed, and in 50 per cent of primiparae it spells a posterior position.

Cæsarean Section.—Cæsarean section is one of the operations of emergency, and in this country it is an operation which every hospital staff should be capable of tackling because of the frequency of its indications. It must be remembered that the dictum "once a Cæsarean section always a Cæsarean section" is no longer tenable, for if the uterine incision has been correctly sutured with silkworm gut and catgut the scar will not jeopardise a future pregnancy *per vias naturales*. In India, unfortunately, it is the rule rather than the exception for patients to be seen or brought to hospital after the membranes have ruptured, but if the foetus is alive, the *low cervical operation of De Lee* renders it possible to deliver the mother with safety. For instance, Hirst in America has published 107 such operations after the membranes have ruptured, sometimes for days and after repeated examinations have been made, with only two maternal deaths. De Lee reports 136 with seven deaths. Such statistics cannot fail to impress surgeons in India. The operative technique is not difficult and can be very clearly followed in the beautifully illustrated article in the last edition of De Lee's book. The writer's experience is in complete agreement. The only disadvantage is that it takes more time. But in future operations the writer proposes to adopt the semilunar incision through the lower uterine segment with its convexity downwards which is advocated by Dr. Hendry of Glasgow, for the danger of hæmorrhage or risk of injuring the bladder are less therewith.*

* Since writing the above an opportunity of doing this has occurred with complete success, in just such a case as reported by Hirst. Mother and child living and well.

the uterus in the last few weeks of pregnancy. Frequently he has inadequate assistance, therefore the writer offers the suggestion that he should remember the letters D, 5 Ps and 3 Bs which stand for briefly:—*Douche*, *pituitrin*, *perforate the membranes*, *plug tight*, and *put on a pressure pad*. Apply a tight binder, keep the bowels and bladder empty. After 12 hours do podalic version, bring down a leg and leave to Nature to deliver slowly. *Faute de mieux*, this mnemonic is as equally applicable to hæmorrhage from a normally situated placental site as from a low implanted placenta.

Delay in the first stage, due to premature rupture of the membranes or *spasmodic or rigid cervix*, is one of the most frequent causes of distress and danger.

Dr. Polak of Brooklyn teaches that, where there is no abnormality in the size of the pelvis or child, one should:—

(a) Try the effect of the injection of a quarter of a grain of morphia and grain 1/200th scopolamine. Give hot vaginal douches every two hours and take care that the bladder and rectum are kept empty.

If this fails he advises that the whole vaginal vault cervix, and vagina, should be packed with gauze soaked in boroglycerine. The cervix then becomes soft, and after the rest ensured by an injection, labour proceeds normally and successfully.

Should there be any disparity between the foetal head and the pelvic inlet or outlet, the low cervical extra-peritoneal Cæsarean section should be done. In connection with premature rupture of the membranes, practitioners should remember that if the liquor amnii becomes a saffron colour or stained with meconium, or the foetal heart beats drop to 110 that the life of the child is in imminent danger. Therefore if the cervix is fully dilated and the maximum circumference of the child's head has passed through it, forceps delivery is imperative. Slowing of the foetal heart-rate is of far worse omen than rapidity. Therefore use De Lee's head stethoscope.

If the cervix is not fully dilated nothing should be done, though if the baby is dead perforation of the cranium is the best course to save undue distress and damage of the soft parts. *Hæmorrhage without pain* during the early months of pregnancy is a fruitful source of alarm. But it must be remembered that more than 25 per cent of women in the tropics "lose" a little or much during the first 13 weeks at that time each month when they would have been normally menstruating. Therefore such cases are not cases of threatened abortion and need cause no despondency; rest in bed is all that is needed. However, in this connection it may not be out of place to state that 75 per cent. of abortions occur at or about the time that normal menstruation should occur. But in these cases there is *pain plus hæmorrhage*.

Therefore it behoves the practitioner to warn every pregnant woman that although she may take normal exercise short of fatigue such as golf, tennis, dancing, swimming, etc., during the first five months, she should entirely refrain from all vigorous exercise, including coitus, during "the nine danger days" each month, which are the three days before, during and after that period each month which she would have been menstruating, if not pregnant.

The death of the fetus before and immediately after birth has been more and more the subject of recent research. Holland in London and Browne in Edinburgh have done a great deal of work in this connection, and it is now clear that intracranial hæmorrhage or tearing of the tentorium is the cause of death in 80 per cent of difficult labours, and that hæmorrhage into the spinal cord subsequent to injury is the commonest cause of death in breech presentations. For this reason all authorities particularly urge that every pregnant woman shall be seen in the 36th or 37th week with a view to discovering whether the child is vertex or breech, and urge that if it is breech it should be at once turned.

The relation of the foetal head to the pelvis is of immense importance.

If such examinations as the Munro Kerr or Muller manoeuvre were properly made at the 37th week and if at the same time the urine was systematically examined in all pregnant patients, childbirth disasters would become rare.

At this point we must consider the Kielland forceps, for without a doubt this new forceps is one for all specialists and teachers to acquire knowledge of. The writer found it being used in a large number of the American and Continental clinics. Its greatest advantage is that it accurately fits the head and therefore is of peculiar importance for posterior positions and for transverse lies of the head. The difficulties of learning the use of the Kielland forceps are few, but the obstetrician must be capable of exact judgment as to the lie of the fœtus. Posterior positions in primiparæ are bugbears of all obstetricians, therefore the writer is of the opinion that Kielland's forceps offer very distinct advantages, but they are not forceps for the general practitioner.

Thymic Hyperplasia.—Recently the writer had the privilege of visiting the State University Clinic of Michigan and was able to see the very excellent team work of Peterson and Miller. These two obstetricians have amply demonstrated that enlargement of the thymus, sufficiently great to give rise to grave symptoms such as inspiratory stridor (thymic asthma), cyanosis, dyspnoea, convulsions and even death was far more common than generally supposed.

They have shown that:—

(1) Thymic hyperplasia more frequently occurs in the male children of elderly multiparæ, who have had ante-natal complications.

(2) That radiography is the only sure means of diagnosis of such hyperplasia.

(3) That it is essential that every baby with thymic symptoms should be immediately treated by Röntgen rays lest fatality occur.

(4) That although 30 per cent of new-born children have an enlarged thymus, many show no symptoms, but others develop the classical symptoms later in infancy or childhood, which may prove fatal.

(5) That it is impossible to tell which infants with abnormally enlarged thymus glands are going to suffer from dangerous symptoms. Therefore it is only by routine treatment of all such cases by x-rays that dangers can be obliterated.

Now that the clinical picture is clear, the writer is sure that many clinicians will, like himself, recall cases to mind where, summoned urgently to a case of stridor, early convulsions, cyanosis, or so-called broncho-pneumonia in a normally born infant, accurate diagnosis was negative and all treatment unavailing. But now out of our darkness and impotence cometh forth light, for in future we have in roentgenography a sure means of routine diagnosis and therapy and one more application of preventive medicine.

The writer has seen three cases diagnosed and treated successfully by x-rays since he learned of this method.

Indigestion or diarrhœa in the breast-fed infant is frequently the reason given for taking a child off the breast. Nothing is more foolish, nothing often more disastrous. In 70 per cent of cases excess of sugar or fat in the mother's milk is the cause. In 25 per cent of cases it is the protein in excess.

Therefore in such a case do not give medicines, but (1) keep the nipples of the mother and mouth of the infant clean; (2) feed at both breasts for 7 minutes three-hourly, and before each breast feed, give 1 oz. of boiled water in which 5 grains of bicarbonate of soda have been dissolved; (3) give water between the feeds with a quarter level teaspoonful each of bicarbonate of soda and salt to the pint, dissolved therein; (4) weigh the baby regularly before and after each breast feed for a few days, and check on a chart the gain in weight per feed. If it is getting too little at a feed, supplement that feed with whey or skimmed milk. If too much, lessen the time at the breast; (5) the mother should avoid worry and constipation. Take ordinary diet but more fresh

vegetables, fresh fruit and salads than hitherto. She should *not* take in excess milk, sago and all those things beloved of nurses which cause abdominal distension and constipation, such as cotton seed, large quantities of milk, stout, rump steaks and curry; (6) each breast should be hot and cold sponged for a quarter of an hour twice daily and gently massaged from the periphery to the nipple; and (7) she should rest on her bed from 12 noon to 3 p.m. and remember that breast feeding is Nature's provision, that next best to this is cow's milk, whereas proprietary foods spell a whole gamut of ills, immediate and remote, such as acute gastro-enteritis, spasmophilia, rickets, chronic gastro-intestinal catarrh and glandular complaints, which may haunt the child all its life.

Röntgenography.

It may be said here that x-rays are being used more and more to facilitate the accurate diagnosis of abdominal tumours, especially pelvic ones where there is suspicion of pregnancy or a dermoid.

For conditions as to the size and lie of the foetus it is also very useful in those patients with large abdomens, for the radiograph may determine the necessity for Cæsarean section, induction, or version, or presence of twins.

The pelvic canal can be beautifully shown but unless the radiogram is stereoscopic it is difficult to adjudge data conclusively. On several occasions the writer has been able to demonstrate *outlet contraction*, which is a condition of the greatest importance to discover early and one far more commonly disastrous than previously thought to be, and, according to Blair Bell, it is the most frequent cause of complete rupture of the perineum and cerebral injuries.

The Puerperium.

Puerperal sepsis has not lessened appreciably during the last 25 years. But it is to be hoped that with better ante-natal care and less middlesome midwifery on the part of doctors and nurses the statistics of the second quarter of the century will be greatly improved. It has been proved that coitus during the last three months of pregnancy is a fruitful cause of sepsis. Therefore it is to be hoped that doctors will not be shy of warning husbands against this in future. Rectal examinations instead of vaginal examinations have not lessened the frequency of sepsis.

It must be remembered that labour is a pathological process frequently associated with morbid lesions. Therefore every patient should be shaved. Moreover it must be borne in mind that the vagina normally contains pathogenic organisms and that the lochia are alkaline. Therefore if there are injuries to the genital canal these organisms can very readily thrive and should resistance be lowered, virulent sepsis, with possibly the *streptococcus hemolyticus* as cause, may be started.

Quadrupeds very rarely develop puerperal fever in spite of the filthy conditions of their accouchement. The reason for this freedom is that Nature has so arranged that the line of drainage from the uterus to the cervix and vaginal outlet shall be downwards and outwards. Therefore should we not copy quadrupeds and place our patients for at least ten hours in every 24 in the right or left Sims' position? Till recently it has been the custom to keep Europeans during the puerperium for many days on their backs. The result is that the lochia tend to collect, in the uterus which may drop back, or in the posterior cul-de-sac, where pathogenic organisms can thrive and produce fever, if there have been genital lesions, or germs introduced. But if the patient lies in the right or left Sims' position for 8 to 10 hours per day with the head of the bed raised fever does not occur so frequently after a long labour, because these discharges can drain out. In almost every American clinic nowadays patients are being placed as a routine after labour for so many hours in the right or left Sims'

position, and leg and abdominal muscle exercises are ordered, to promote drainage.

The writer has demonstrated that it is possible to make a diagnosis of the type of organism that is attacking the patient by closely watching the physical signs and symptoms. Such diagnosis has the advantage that it greatly facilitates prognosis and treatment.

For instance staphylococcal infections show themselves by a slow ladder-like rise of the temperature; a stinking discharge, with pain, tenderness and distention below the umbilicus.

Streptococcal infections show themselves by rigors of early onset, a very rapid pulse, great anæmia, diarrhoea, non-smelling lochia, pain and tenderness below the umbilicus, with often general tympanites of the abdomen.

Bacillus coli infections are usually late in onset, with slow pulse, clean tongue, non-anxious expression and general puffiness of the abdomen. The urine is acid and opalescent.

In a doubtful case bacteriological examination of the urine will frequently give the clue. It should be remembered that 75 per cent of puerperal fever patients recover. In India a sloughing cervix, vagina or perineum are the commonest causes of puerperal fever.

Dr. Gordon Luker has reduced the mortality of streptococcal puerperal fever from 60 per cent to 30 per cent by his technique, which consists of:—

(1) 30 c.c. of anti-streptococcal serum three days running.

(2) Intramuscular injections of 5 grains of quinine every other day.

(3) Placing the patient in Fowler's position and giving hot rectal and vaginal douches 4-hourly.

(4) Prescribing large doses of alkalies by the mouth 4-hourly together with stimulants.

Under no circumstances or for any condition of puerperal fever is an intra-uterine douche to be given. Perhaps in this connection it is as well to quote the dictum of Professor Watson of Edinburgh that if a piece of placenta is known to be retained inside the uterus and that piece is no bigger than a dry walnut it should be left alone. Ergot, pituitrin and vaginal douches will cause it to be extruded in the great majority of cases. But if the piece retained is bigger than a dry walnut then it should be removed under an anæsthetic with sponge-holding forceps, the fenestræ of which are covered with gauze. The finger or intra-uterine douche should never be used. The reason why any intra-uterine douche is always contra-indicated is because the pressure at the nozzle of such a douche is at least 7 lbs. to the square inch. Therefore such pressure may drive organisms on the surface into the deep uterine sinuses and set up rigors by dislodging septic emboli or protein particles. Moreover it must be recollected that the Fallopian tubes may be patent and therefore the germ-containing fluid may be carried into the general peritoneal cavity—this latter occurrence being particularly prone to occur up to the 6th month of pregnancy.

Parenthetically it may be here stated that for the latter reason, following the gynecological operation of *dilatation and curettage*, nowadays very few surgeons flush out the uterine canal, lest the fluid be carried through the tubes to the peritoneal cavity. The surgeon contents himself and safeguards his patient better by drying the cavity, swabbing with iodised phenol and putting in a gauze wick drain; for who can say what harm may not occur to the delicate ciliated tubal and fimbrial epithelium, to say nothing of the pelvic peritoneum from an alien fluid or possibly septic uterine cavity.

Retained Placenta.—In many instances this condition occurs owing to the nurse or doctor worrying or rubbing the uterus immediately after the expulsion of the child. Such treatment inhibits proper retraction of the uterus. In the absence of hæmorrhage the sole duty of the attendant is to control the fundus of the uterus and nothing else,—either with the hand or sausage-shaped sandbag.

Retained placenta is most common after a long and tedious labour where shock and exhaustion are present. It cannot be too urgently impressed upon attendants that if there is *no hæmorrhage* but there is exhaustion and shock, their first duty to the patient is to control the uterus and place the patient comfortably in bed, if need be giving a hypodermic of morphia to ensure recuperation, before attempting expression or manual removal of the placenta under chloroform.

Hundreds of deaths occur every year in India from non-observance of this rule. No other duty or social function should interfere with the proper observance of this rule, for if in a patient already exhausted a hand be introduced into the uterus to remove the placenta the shock will be multiplied by ten and a fatality occur.

During recent years there have been many publications recording fatalities and emphasising the importance of treating the shock, in the absence of hæmorrhage, before attempting manual removal of the placenta. The method of running a pint of saline into the umbilical vein of the cord is only successful in 25 per cent.

Osteomalacia.

During the past year some magnificent work has been done on this subject by Maxwell in Pekin. He has demonstrated the urgent necessity of early diagnosis in these cases and shown how frequently the condition occurs, and one's experience in India confirms this. Dr. Maxwell and his fellow-workers have proved incontrovertibly that osteomalacia is one of the deficiency diseases of pregnancy, and if these patients in the early stages, suffering from the symptoms of osteoporosis and softening of ligaments with the subsequent pains and aches, are treated with a full vitaminic A, B and C diet and are given calcium lactate and large doses of cod-liver oil over a long period, the symptoms subside and changes in the bones do not occur to an appreciable extent, *vide* writer's article pp. 53-55, in this number of *Gazette*.

The value of this work should be particularly applicable and known in India.

GYNÆCOLOGY.

Wilfred Shaw in London has carried the work of Hitschmann and Adler in 1908 a stage further on the subject of the relation of ovarian function to *menstruation*. It is now possible to state:—

(1) That the pre-menstrual changes are first observed about the 14th day of the cycle; the cycle being regarded as commencing on the first day of the menstrual discharge. At the end of the menstrual cycle, the pre-menstrual endometrium resembles the decidua of early pregnancy.

(2) That ovulation in the human female takes place between the 13th and 17th day of the cycle. This fact is of extraordinary interest to those who are cognizant of the Mosaic law, for most readers are aware that despite persecution, the Jews are the most prolific race in the world, but perhaps they are not aware that coitus amongst orthodox Jews may not occur before the seventh day following the *last* day of menstruation. Thus we find the Mosaic law empirically demanding that coitus should occur on or about the time of ovulation.

The writer has found as the result of observation over many years that the elective days for procreative coitus are the 7th, 9th and 11th days *after* the cessation of the menstrual discharge.

Sterility.

Sterility is a problem which has always been a difficult one to solve. It will help matters to divide the causes of sterility into four groups from the point of view of the woman, *viz.*:—

- (a) Developmental.
- (b) Congestive.
- (c) Infective.
- (d) Constitutional.

It is probable that at least one-quarter of sterile women owe their condition to developmental defects which in future generations may be prevented by making

the mother understand the dangers of overtaxing the nervous and physical powers of their daughters during puberty and early menstruation.

Moreover it is certain that the diet of the modern child from infancy to adolescence is responsible for many defects, for in this era of patent milks, tinned foods and badly cooked substances lacking essential vitamins there can be no question that the endocrine system of the young girl is starved often from birth of essential vitaminic stimulants. Hence the dictum:—

"The vitamins are to the endocrines, what the endocrines are to the economy."

Many cases of sterility of congestive origin are due to ignorance of or irregularities in marital habits. The practitioner should not burke enquiry into such intimate matters if he has the requisite knowledge to proffer.

In recent years the *Rubin insufflation test* has been of great aid in helping to discover the cause of sterility in some cases, and curing sterility in others. This test is extremely simple and the writer has used it in many scores of cases. It should be done on the 5th day following the cessation of menstruation, no anæsthetic should be given, great care should be taken that there is no sepsis in the cervix and that the pressure of CO₂ should not be allowed to register over 160 mm. of mercury. The writer uses Dr. Rubin's own apparatus but that of Dr. Provis is equally suitable. In a future paper the technique and results will be described. Experience has proved that 12 per cent of sterility cases can be cured by this test alone.

In this era of *birth control* a word of warning on the subject of contraceptives is necessary. It has been shown that if contraceptives are used by women for a consecutive period of three years after marriage, in only 10 per cent. does a future pregnancy occur. The explanation is that such abominations as quinine pessaries and cervical caps, etc., tend to cause an endocervicitis with destruction of the cilia. Moreover, in view of the recent work of Barnard and Gye on cancer it may here be pertinent to enquire whether the increase of cancer in women who have had only one or two children, may not be related to the frequency of endocervicitis accompanying old lacerations, and the use of contraceptives.

Here when mentioning endocervicitis the writer would like to introduce a word of protest against the common practice of painting *erosions of the cervix* with picric acid and other solutions. An erosion is the outward and visible sign of an inward and invisible endocervicitis. Therefore all such applications are utterly useless, for it should be realised that the cervix is the tonsil of the pelvis. And that whereas the erosion is visible, the endocervicitis with its crypts and hypertrophied racemose glands is the hidden cause of the leucorrhœa and pain in the back, anemia or joint pains and that no solution can penetrate or disinfect these glands or ovulate Nabothi, though possibly ionisation might do so. Hence severe erosions, or endocervicitis should be treated by the Bonney or Sturmdorft technique.

The sacral ache of erosions is due to enlarged glands in the hollow of the sacrum pressing on nerves.

It is not sufficiently known that 60 per cent of gynaecological lesions are due to and the direct result of poor obstetric practice. It therefore behoves us to urge that *every practitioner should attend a proper post-graduate gynaecological and obstetrical course* at least once in five years and that the teaching of this subject to the present and future generations of medical students should be based on anatomical and pathological lines. For instance a student often becomes qualified without in the least understanding the imperative importance of the pelvic floor and pelvic diaphragm. Too frequently is the teaching of obstetrics made a water-tight compartment separated from an equally water-tight gynaecological department. The teaching of these subjects should be by a live method so that students and post-graduates may visualise and memorise.

No gynaecological demonstration can be complete unless the teacher has multiple half-sections and dissections

of the female pelvis before the class. The writer's practice is to keep a dozen pelves removed at autopsy by amputating the thighs and dividing the vertebral column in the lumbar region. Some of these specimens are sagittally divided, and all of them are chosen at autopsy to illustrate morbid lesions, one and one only being normal. Teaching students and post-graduates in this way, they can examine and see all the important points. Moreover pelvic surgery becomes then a subject of ease and interest to elucidate.

Similarly, in teaching obstetrics, the live recently-born infant is placed in a large specially-constructed female dummy, the manœuvres and mechanisms of labour, together with every variety of presentation and lie can then be illustrated. Such demonstrations are live things and not dummy ones and thereby interest and intelligence are titillated.

Hæmorrhage from the non-pregnant uterus is the first and commonest sign of cancer, but, alas, in India it is the exception rather than the rule for patients to be seen sufficiently early to warrant Wertheim's operation—invariably it is the old story, hæmorrhage for months and no proper examination.

Only an intensive propaganda on the subject of cancer can do anything to lessen the incidence of this condition.

Radium has its advocates. In America, if the condition is operable, as a rule radium is first used and later operation done. But on the Continent and in England most surgeons, because of the disadvantages of radium, prefer when possible to operate first and later use radium.

It cannot be stated too strongly that radium only rarely has any curative effect, whereas surgery in early cases is successful in 60 per cent.

In many clinics a cervix which is lacerated, eroded and hypertrophied, is looked upon as potentially a pre-cancerous cervix. Therefore in all these cases a high amputation of the cervix or a vaginal hysterectomy is advised or done.

Chronic metritis is a condition peculiarly common to-day. Some suggest that it owes its origin in many cases to prolonged contraceptive methods, but all are agreed that it is a low grade infection of the uterus, in many cases subsequent to labour or abortion. It causes progressive anaemia from hæmorrhage and is frequently associated with general ill-health such as pyorrhœa and intestinal stasis. These are the cases which drift into hospitals all over the world after having been cured frequently by general practitioners or others. There are only two ways of treatment,—radium or hysterectomy. The more experienced the gynecologist, the more frequently does he prefer to remove this uterus *per vaginam*. The mortality and disability of vaginal hysterectomy for these cases in the writer's practice is 3 per cent.

Miles Phillips of Sheffield has recorded 300 cases with a mortality of 2.5 per cent for this operation.

Abdominal hysterectomy is of course much easier but has a greater mortality and disability rate.

Fibroids are even more common in India than in England. Victor Bonney has revived and popularised the operation of myomectomy in order to conserve the uterus. There is no question whatever that this is the ideal operation whenever possible and should be done. *Endometriomata* have a prominent place in the literature of the last few years, and are undoubtedly far more common than one supposed. They may occur anywhere in the pelvis, but are more frequent on the ovary and in the recto-vaginal space. These tumours can frequently be entirely removed, but sometimes disappear under radium. At operation small hæmorrhagic cysts or puckering of the peritoneum should enable the diagnosis to be suspected. Extirpation of the ovaries and uterus together with the tumour is the best method.

Prolapse, like the poor, is always with us. Indeed it has been stated by an eminent Indian obstetrician that 75 per cent of parous Indian women after the age

of 30 suffer from prolapse. The habits and type of labour in Indian women explain this.

It cannot be too strongly affirmed that should a patient with prolapse seek operative relief, the technique employed must be that of the Manchester School, that is to say prolapse to-day must be treated anatomically by the vaginal route. Too often in India do we still find women coming to hospital with the cervix, bladder or rectum bulging at the vaginal outlet, who narrate that they have had a ventro-fixation in some other hospital. Such surgery is unworthy and an anachronism, for prolapse is a hernia, and can only be treated as a hernia by a technique comprising amputation of the cervix with re-apposition and suturing of the pelvic fascia and levator ani in order to close the hole through which the hernia has appeared.

Stacey Wilson has brought to our notice that *slight uterine prolapse and vaginal laxity*, following difficult or normal parturition can be cured or palliated by *re-education of the muscles* constricting the vagina, so doing away with the necessity of temporary troublesome pessaries. He states that if the tone of the muscles which occlude the vagina in a case of slight prolapse or gaping vagina, after parturition, be tested with two fingers in the canal by asking the patient to contract the sphincter and the levator ani, by "tightening herself up" as if she were endeavouring to control a sudden attack of diarrhœa and one finds that the "grip" is practically nil, that re-establishment of full tonic contraction of these muscles is only a matter of time. The patient is therefore told to contract the muscles of the pelvic floor every hour of the day and to maintain the contraction as long as she can, for when she so to speak tightens the anus to prevent escape of diarrhœa she at the same time contracts and lifts the vaginal vault and outlet.

If these rules are carried out, as they easily can be, the muscles which diminish the lumen of the vagina will in a very few weeks greatly increase in vigour; so much so that they will be able to grasp a single finger with ease, and a continuance of the voluntary efforts will so re-establish the habit of tonic contraction that slightly prolapsed uterus or dropped pelvic diaphragm can be retained in place without any mechanical support.

Another practical point about these exercises, (if they are effectively carried out), is, that not only does the sphincter vaginae regain its tone but the walls of the vagina come to lie normally in apposition again, so curing that most distressful symptom of *ballooning of the vagina* with air or water so frequently complained of.

Retroversion of the uterus is a perpetual source of strife. One school urges operation in every case, another will not operate unless there are symptoms such as sterility, dyspareunia or associated prolapse. Between these two schools there is a golden mean, for although many patients with a retroverted uterus do not become pregnant, there is no doubt there are many who do conceive.

It is exactly in cases of retroverted uterus that the *Rubin insufflation test* is so valuable, for Rubin has shown incontestably that all such cases should first undergo this test. His contention, is after a thousand insufflations, that if the CO₂ passes with ease through the tubes and without undue pressure with the uterus still retroverted there is no indication for operation for sterility *per se*; but, if the CO₂ does not pass easily or only under excessive pressure or after first anteverting the uterus, it is to be presumed that there is a mechanical kink in the tubes. These are the cases for which Gilliam's operation is so gratifying in its results.

Such being the scientific aspect and explanation, it behoves all gynecologists to set their hearts against the glamour of doing an abdominal operation for which, unless this test has been done, there is no scientific justification.

Of course a retroverted uterus associated with prolapse of the uterus or prolapse of the ovaries, is entirely a different matter demanding different treatment.

Retroversion after the Puerperium.

It is very necessary to bring to the notice of all practitioners the universal teaching that every puerperal patient must be examined 15 to 21 days after confinement. From a very wide and long experience the writer is afraid that this rule is not observed in India as closely as it should be, with the consequence that prolapse, backache, and what some call the subinvolution uterus (chronic metritis) are very common.

If puerperal patients were treated from the beginning by placing them in the right or left Sims' position for 8 to 10 hours per day, retroversion would less frequently occur with its sequelae; for obviously a bulky, backward uterus tends to slide down the line of the vagina and project as a hernia, through the recently stretched and perhaps poorly involutioned pelvic diaphragm—giving rise to those symptoms of the "inside coming outside", so often complained of, when the patient stands or walks about after confinement.

In the majority of cases all that is necessary is to insert a ring pessary, after reposition of the uterus, for 6 to 8 weeks. But let it not be forgotten that prevention by early postural treatment is the best method.

Endocrinology.

It is recognised to-day that the strains and stresses of the human body are harmonised by two main agents—the central nervous system and the endocrine glands. This fact becomes all the more interesting in consideration of the recent work of Keene and Hewer, who have shown that the function of the pituitary, adrenals, thyroid, parathyroid and thymus are actively established between the 8th and 20th week of foetal life.

It is unnecessary to reiterate well-known facts, but the writer wishes to emphasize certain recent observations of Langdon Brown, Vines, Cushing, Moore, Williams, and Berman which have proved to be of diagnostic value.

For instance, *thyroid deficiency* may show itself by stunted growth, nocturnal enuresis, night terrors, relaxation of ligaments, delayed puberty, back-ache, orthostatic albuminuria or absence of the outer third of the eyebrow. Langdon Brown calls attention to the fact that tonsillar hypertrophy and sepsis are also frequently associated with hypothyroidism in children, and it would appear that this is to some extent due to defects such as a lack of iodine salts and vitamins in the diet.

The exhibition of parathyroid combined with thyroid gland is useful for those devastating symptoms of the menopause occasionally met with.

The pituitary gland like the thyroid hypertrophies during pregnancy; this accounts for the enlargement of the face and pelvis which so frequently occur. It is probable that the glycosuria of pregnancy has a similar explanation.

Pituitary insufficiency before puberty causes obesity, principally below the navel, non-development of the secondary sex characters and the *masculine type of pelvis in women*. After puberty it causes amenorrhœa. This form of amenorrhœa is best treated by intramuscular injections of pituitrin daily for three weeks, although Williams recommends 10 grains of the whole gland by the mouth three times a day. In connection with pituitary insufficiency, Cushing has observed a very curious trio of conditions viz.:-

- (1) Absence of the half-moons of the fingers.
- (2) Small black moles, (beauty spots), all over the body.
- (3) Spaced, under-developed or twisted upper lateral incisor teeth.

The writer has confirmed these observations on many occasions; such people are undersexed and obese below the waist line.

The ovarian hormone co-operates with the thyroid, parathyroid and pituitary glands. It is the ovarian hormone factory, including the corpus luteum, that is annihilated by x-rays.

In connection with the gonads, Williams quotes Virchow's dictum:—

"Woman is a pair of ovaries with a human being attached: whereas man is a human being furnished with a pair of testicles."

Although not strictly related to gynaecology, perhaps Scotch readers will be interested to learn of the research work of Dr. Moore of Chicago on the *testis*. He has shown that the normally descended testicle, when artificially replaced within the abdomen rapidly degenerates, but if it be rescued and put back into the scrotum it gradually recovers. He concludes therefore that temperature has something to do with the health of the normal testis, and that this is the explanation of that grotesque structure, the scrotum, viz., that it is a thermo-regulator to maintain the health of the seminiferous tubules. Williams therefore aptly asks if the over-clothing of the scrotal area which is so habitual in elderly men is not a powerful contributory factor in determining premature decline in sexual capacity. For verily the advantage of free ventilation of the scrotal area may be seen in the *bodily* and sexual vigor of those who wear kilts!

The *adrenal glands* are very closely related to the gonads and also to the vegetative nervous system, as is well known.

But recently it has been shown that if the cortex of the adrenals does not develop properly in the foetus, an anencephalic monster is born, showing that the adrenals have also a direct relationship with the central nervous system. *The adrenals are the organs of fight, flight and fright*, i.e., they are the organs of response to the emotion of fear. Individuals of the adrenal type are very hairy over the chest and body; often they are red-haired and have large canine teeth; often they are freckled, big boned and have a large sex appetite.

The adrenals are organs of peculiar interest to the sun-dried Anglo-Indian, for that the vigour of this combative gland rapidly declines with advancing years (and in this climate particularly) is a matter of common observation. Indeed one asks oneself did the great Francis Bacon foresee this research when he wrote in 1600 A.D.:-

"Men of Age Objecte too much, Consulte too long.

"Adventure too little, Reporte too soone, and seldome

"Drive Businesse home to the full period; But contente themselves with a Mediocrity of Successe."

Finally, it may be of interest to readers of a philosophic turn of mind that the first reference to the adrenal type of man one can find is in Genesis, chapter 25, for in the account of Rebecca's confinement it is written:—

"And when her time was come to be delivered, behold twins were found in her womb. He that came forth first was red and hairy like a (kid's) skin and his name was called Esau. Immediately the other coming forth, held his brother's foot in his hand, and therefore he was called Jacob. And when they were grown up, Esau became a skilful, cunning hunter and a man of the field, but Jacob a plain man and smooth, dwelt in tents."

Does not this ancient reference open up a grand vista of thought? Does it not, through the ages, foreshadow certain easily recognised racial characteristics of to-day dependent upon or due to endocrine differentiation and development?

"O day and night, but this is wondrous strange,

And therefore as a stranger give it welcome.

There are more things in Heaven and earth, Horatio, Than are dreamt of in your philosophy."

RETIRING.

By "I. M. S., retired."

WHEN bearing the full heat and burden of the Indian day many an I. M. S. man looks forward very longingly to the arrival of the day when he can afford to retire from his active service in India, and return to his misty northern island home.

There is many a civil surgeon whose day is full of work and responsibility in a trying climate; whose opportunities for leave are perhaps few, or who, may be, thinking he will bring the day of retirement nearer does not even take such opportunity of leave as is afforded him.

To such, hardly a day passes without his thinking of the day when he sees for the last time what someone has described as the best view in the East, Bombay harbour from the stern of a P. & O.

Yet when that time comes he will find life at Home full of new difficulties which he did not perhaps anticipate. Perhaps he has nothing to attach him to any particular part of the country, and the greater the choice the greater the difficulty. This happened to the writer who spent his first year wandering all over Great Britain, staying here and there, and never being able to decide, until finally in despair he went for a week-end to a place where he had a couple of old hospital friends; arriving on Saturday night, and buying a house he did not like on Monday morning.

No one will let you rent a house these days for fear of falling prices; prices are coming down, but you cannot judge by advertisements. A pre-war £1,000 house now fetches about £2,500.

It is quite likely that if the place is found that seems the one "beloved over all" there will either be no available house, or none that is suitable, and one has to be built. This has also happened to the writer. The price of building is falling; the firms who tendered £3,500 for a simple eleven-roomed house in 1921 re-tendered and built for £2,400 in 1923, in other words a simple building which cost about eighteen pence a cubic foot in 1921 fell to tenpence or one shilling by 1923, and still costs about the same price.

I remember we had very hazy ideas on how much it would cost to live at Home in reasonable comfort. The writer and his wife have found living in the country with two servants, a gardener, and a car, and no family, and no entertaining beyond friends to stay in the summer, costs about £100 a month tax free, or £1,500 per annum, to allow for holidays, income tax, etc.

Domestic servants are a difficulty; the old faithful servants we associate with the old home of our youth are no more. To get any in the country is difficult, and such may be reckoned to cost, in wages and food, £100 a year each. The writer advertised for a cook general for a month at £52 a year, and did not get a single reply. He put in one small advertisement in a nursing paper for a trained gentlewoman as nurse companion to a relative at £60, and got over 70 replies in three days. Such are conditions of service in England to-day.

Besides all this, with the present trade depression, there is the constant menace of industrial trouble; but one must not be misled either by the noisiness of a very small minority, nor by the national characteristic of everlasting self-depreciation. After all the old country is still the best place in the world to live in.

When the situation of the house has been decided on, the house found or built, the servants obtained, the furniture bought, and the boxes have been unpacked, the most difficult matter of all remains. *What to do?*

To anyone whose days have been full of work, interest, and responsibility; whose every action almost has affected the life of somebody; the pursuit of sport, pleasure and pastimes soon palls, and becomes stale, flat and unprofitable.

The I. M. S. man's career has unfitted him for general practice, nor did he retire with the object of spending his days in an occupation more than ever full of anxiety and worry, disturbed nights, and unpaid bills. Nor of course is the social position of the general practitioner in England that of the I. M. S. officer in India. There is nothing snobbish in the fact that looking back on one's service in India, one of the things one appreciates now more than anything is the fine class of European who manned the Indian Services, and formed

one's circle of friends. After retiring, few new ones are formed of the same class.

There is consulting work, but that again is open to very few; only to those I. M. S. men who have world-wide reputation only are the staffs of our big medical hospitals open—to the many, there is little chance in the consulting world against the young men who for years since they took high qualifications have been working, and working hard, and for nothing, to be in a position to apply hopefully for any such hospital appointment as may become vacant. To do consulting work without being on a hospital staff holds no prospect of any success.

There is however a branch of medicine very suitable for a retiring I. M. S. man, if he will only make himself conversant with it before he leaves India, viz., private or public sanatorium work; the former for choice.

But many men imagine that anyone can run a sanatorium, and do not even recognise that it is a branch of work requiring much special study, experience, and character, if the sanatorium is to be a success.

But an I. M. S. man with retirement in view could do much to prepare himself to take up such a post, for example by reading the proper literature, and by making himself conversant with x-ray work, especially x-ray chest work; and the technique of induction of artificial pneumothorax. This latter is being commonly used in all first-class sanatoria now, and the facilities for acquiring dexterity in it are much greater in a civil hospital in India than in either the general or special hospitals in England, where the I. M. S. man has no standing. He could supplement this by a short course at special hospitals on coming Home, and if put in the way of it by some one connected with the sanatorium world, could get an insight into the routine work. The writer has found much interest, happiness, and no small addition to his pension in this manner. Should any I. M. S. man with retirement in view think of taking up such work, the writer would be pleased to correspond with him, and could probably be of some assistance to him as the Editor has promised to forward any such letter to the writer.

Current Topics.

Proceedings of the Permanent Committee of the International Office of Public Health.

THE following is an abstract, translated from the proceedings of this Committee, prepared from materials kindly forwarded by the Public Health Commissioner with the Government of India, of the session April—May, 1925:—

The meeting was held at Paris from the 27th April to the 6th May, 1925, and was attended by delegates from 28 different countries and states, Lieutenant-Colonel J. D. Graham, C.I.E., I.M.S., Public Health Commissioner with the Government of India being present as delegate from the Government of India.

It was noted that no less than 13 states had signed their willingness to adhere to the suggestions put forward by a sub-committee for the provision of free diagnosis and treatment of venereal diseases among sailors of the mercantile marine services at different international ports. A circular with reference to the standardisation of anti-diphtheritic serum also received general assent. Further, 19 out of 37 states circularised had expressed their adherence to a proposed scheme for sanitation of maritime ports in different countries. The special report by the Council of Hygiene of the League of Nations with reference to the Opium Convention was also considered.

Subsequent to this, the present position with regard to certain epidemic diseases was considered:—

Anthrax.—On the suggestion of the Minister for Agriculture, Czecho-Slovakia, the proposition was considered as to the feasibility of the control of anthrax at the port of export of infected hides, rather than at the port of their entry. It was noted that, although this industrial disease has now become relatively rare, yet it cannot be altogether neglected; for instance, 873 cases with 126 deaths have been recorded in Great Britain during the past 15 years.

Scarlet Fever.—The replies to a general questionnaire sent out were considered. In Roumania, a country where the disease was formerly frequent and with a severe mortality, it had almost disappeared during the great war, and had since recurred only in attenuated type. Isolation of cases has proved the most valuable of general measures, having reduced the case mortality from 25 per cent. in 1898 to 6.9 per cent. in 1923. Bacteriological studies, especially in America and in Italy, had shewn that the problem of the ætiological agent was now presumably solved, but it was as yet too early to make a definite pronouncement.

Plague.—Reports were considered from Holland, Japan, Norway, and various British colonies. The British colonial report in general dwelt upon the necessity for systematic observations upon the geographical distribution of different rat species and the different geographical and seasonal distribution of their fleas. It is hoped that a detailed report may shortly be considered. In Tananarivo, Madagascar, *Mus alexandrinus* proved to be the prevalent species, and *Xenopsylla cheopis* the prevalent rat flea species. *Pulex irritans* was rare, but *Ctenocephalus canis* a flea frequently found in houses. In Europe generally, with the replacement in the 18th century of the black rat by the grey, plague had disappeared. *X. cheopis* is apparently the chief agent in the spread of plague throughout the world, especially when it is transported from port to port via ships harbouring infected fleas; but *Ceratophyllus fasciatus* is also of importance. *Ceratophyllus* tends to increase in numbers as *Xenopsylla* disappears, whilst the rôle of *Pulex irritans* is nearly negligible.

Cancer.—A special report on cancer incidence in Spain from 1900 to 1920 was considered. It was further noted that in Czecho-Slovakia a marked increase had been noted in the cancer incidence rate, especially among females. In 1919 the incidence of deaths from cancer was 45.2 per mille of deaths, in 1923 no less than 60.1 per mille.

A special enquiry into the percentage of operable cancers of the uterus in England, Italy and Holland had shewn that only some 10 per cent. of such cases gave favourable prospects of cure by radical operation. In Belgium a total cancer mortality of 50 per mille of deaths was probably correlated to a general increased average expectation of duration of life as the result of improved measures for public health.

Relapsing Fever.—A special report attributed much of the so-called relapsing fever in Persia to the malarial parasite, rather than to relapsing fever. The true rôle of *Argas persicus* as a transmitter remains to be elucidated.

Leprosy.—The leprosy incidence appeared to be declining; and, as with syphilis, most of the cases appeared to be under hospital control. In Norway the incidence had fallen from 2 per cent. of the population in 1852 to 1 per 20,000 of population in 1923. In Algiers only about 150 cases had been reported in 30 years; Jews were not affected; the indigenous inhabitants were almost exempt; but the chief incidence was amongst Europeans and especially Spaniards. A sum of some £30,000 had already been collected by the British Empire Leprosy Relief Association. In Indo-China a census in 1923 had shewn a total of 5,813 lepers, of whom 4,454 were already segregated in institutions. Here the practice of village segregation had proved especially useful, and was more readily tolerated than

isolation in asylums. In New Caledonia 1,168 lepers were reported, an incidence of 2.48 per cent. of the population, and village segregation was in vogue. Treatment by the ethyl esters was giving encouraging results, but a final opinion on this subject could not yet be given.

Kala-Azar.—The position was interesting. A special commission was working in Assam under the ægis of the Indian Research Fund Association on the transmission problem. (The information on this heading in Dr. Pottevin's minutes is inadequate. In addition to the commission in Assam, a whole-time chair in research work on this subject has been endowed for the past five years at the Calcutta School of Tropical Medicine by the Indian Tea Association; a further auxiliary enquiry at the same School has been in existence for the past two years—endowed by the Indian Research Fund Association; a special enquiry has been endowed by the Madras University; the Royal Society of London has now a special commission consisting of Dr. Hindle and Major W. C. Paton, I.M.S. (retd.), working in China; whilst the Public Health Committee of the League of Nations has recently appointed a special commission to investigate the problem as it occurs in Southern Europe and the Mediterranean area. If this—the most difficult current unsolved problem in tropical medicine—is not solved within the next year or two, it will not be for want of funds applied or of skilled investigators appointed to enquire into it).

Tabes and General Paralysis of the Insane.—Information as to incidence in different countries is still being collected. In Japan it is stated that treatment has of recent years so modified syphilis as a disease of the indigenous race that it is not at present possible to speak with certainty as to the incidence of tabes and of "G. P. I." In British India medical opinion appears to be almost unanimous that whereas such diseases are not uncommon among Europeans they are very rarely seen in Indians. In Germany, it would seem that, with increasing success of the treatment of visceral syphilis, neuro-syphilis appears to be on the increase. On the contrary the reports from England do not bear out such an idea.

Alastrim.—In 1924 in England and the low countries there were notified 3,797 cases of small-pox. They were of all mild type, and only 8 deaths were recorded; 10 only were confluent and 3 only hæmorrhagic,—these last 3 all proving fatal. Most of these cases occurred in non-vaccinated persons.

Does such evidence tend to shew that the virus of small-pox is, to-day, less virulent than formerly? A special report on this subject from Portugal was promised for the next session of the Committee.

Miscellaneous.—In Italy the general death-rate at 16.48 per mille of population was now similar to that prior to the years of the great war. A special Act for the betterment of public health, recently passed under the Mussolini regime, was perhaps the cause of this.

Special memoirs contributed dealt with an ethereal vaccine against rabies; the rôle of cholera-carriers in epidemic cholera in Japan and British India; yellow fever in West Africa; typhus in Japan; and practical insecticides. (It is obvious that the sphere of work and investigations concerned cover a large area and are of considerable importance in the field of tropical medicine.)

The Cultivation of the Human Entamœbæ.

A VERY important advance in tropical medicine, and one of which due notice must be taken in these columns, is that the entamœbæ of the human intestine have been successfully cultivated *in vitro*. Prior to 1924 several workers had claimed partial success with different methods, but it has remained for Drs. W. C. Boeck and J. Drbohlav in America to achieve full success. In connection with this very important discovery, it is most unfortunate that its original announcement appears to have been shrouded in that uncertainty which so

besets the literature on the entamœbæ of man. The first successful cultivation of a true entamœbæ—as distinguished from cultivation of free-living amœbæ—was that of Barret and Smith (1924) of *Entamœba barretti* of the turtle.

At the 20th annual meeting of the American Society of Tropical Medicine, held at Chicago in the summer of 1924, Dr. Boeck read a communication on June the 10th, 1924, on the successful cultivation of *Entamœba histolytica* of man *in vitro*. Of this, the only notice taken was a mere note in the published minutes of that meeting. Meantime, Dr. Drbohlav returned to Europe, and at a meeting in November 1924 of the Royal Society of Tropical Medicine and Hygiene in London, and afterwards at a meeting in Paris of the Société de Pathologie Exotique in February 1925, he demonstrated the technique employed and the living entamœbæ in artificial culture *in vitro*. The journals of both societies published preliminary notes on the subject, giving the composition of the media used, but only scanty details.

These publications aroused universal interest; and Boeck and Drbohlav's technique was adopted by many laboratories all over the world. Although detailed papers on the subject were promised for publication in the *American Journal of Tropical Medicine* and in the *Annales de Parasitologie* in 1924-25, they failed to appear in these years. The experiments were repeated by Professor Dobell and Dr. Wenyon in London, by several workers in France, America, and the Philippines (and at the Calcutta School of Tropical Medicine). In brief the work of Boeck and Drbohlav was confirmed by many different workers in many different countries before their full paper was finally published. This final and detailed publication, illustrated with numerous and beautiful micro-photographs, finally appeared in the *American Journal of Hygiene* for July, 1925, Vol. V, No. 4, p. 371; and laboratory workers interested in the subject should refer to this, the full and detailed original account of the subject, rather than to the earlier and more scanty information available.

Cultivation of *E. histolytica* was first obtained by accident. A stool was cultivated in the medium first employed by Boeck for intestinal flagellate protozoa, and it was found that motile *E. histolytica* grew in this culture medium. Further experiments were made, and a standard medium elaborated. The procedure finally adopted and recommended is as follows:—

Four eggs are sterilised on their surface (with alcohol or by other means), and their entire contents aspirated into syringes and emulsified with 50 c.c. of Locke's solution. This fluid is then distributed into sterile test tubes in the usual way, sloped and set by heat. (Or Dorset's egg medium, or ordinary bacteriological blood-agar can be substituted). This constitutes the solid basis of the medium. Its fluid constituent consists of inactivated serum (human or horse) diluted 1 in 8 with Locke's solution; or egg-albumin diluted with Locke's solution (the white of one egg to a litre).

The solid medium, after tubing, is sterilised in the autoclave, and the liquid medium subsequently added, 2 to 3 c.c. being poured over the surface. If there is any reason to doubt the sterility of the serum or fluid element it may be filtered through a Berkefeld filter candle, (but this has proved not to be necessary with sera used at Calcutta and collected under ordinary aseptic precautions).

The tubes of culture media, thus prepared, are then kept warmed in the 37°C. incubator,—a most essential step, since only warmed media should be inoculated. They are inoculated by picking up a piece of mucus containing motile, vegetative *E. histolytica*, or a suspected bit of mucus from a dysenteric stool, in a capillary pipette, and inoculating into the bottom of the fluid constituent of the medium, in which the greatest growth of the entamœbæ takes place, at the interface between solid and liquid medium. The cul-

tures should be incubated aerobically at 37°C. (It is to be noted that any slight drop in temperature kills off the cultures at once; thus at the Calcutta School of Tropical Medicine it has been noted that active, rich cultures full of motile *E. histolytica* died off in a night, when the gas supply to the incubator failed, and the temperature fell).

The maximum growth of *E. histolytica* occurs in such cultures at from 24 to 48 hours after insemination. In order to examine them, a little of the sediment at the bottom of the tube should be removed with a sterile capillary pipette and examined under the microscope. After this period the entamœbæ die off rapidly—(probably from bacterial overgrowth),—but sub-cultures should be taken every 2nd, 3rd or 4th day, and in this way strains have been kept alive by different workers for periods of some months.

Under such conditions Boeck and Drbohlav found that not only did *E. histolytica* thrive and multiply very rapidly, but the medium proved suitable for the cultivation of *E. gingivalis*—the common entamœba of the mouth, and of such common intestinal flagellate protozoa as *Trichomonas* and *Chilomastix*. In all their work—as in the work of other subsequent investigators—*Blastocystis hominis*, an exceedingly common fungus of the human intestine,—has proved a tremendous drawback: if present it will overgrow the culture in 48 hours, killing off or starving out the entamœbæ and flagellate protozoa.

The classical work of Dobell has shewn that, when it lives in the mucosa of the colon, *E. histolytica* is a parasite whose protoplasm is bacteriologically sterile. In stale stools in cases of amœbic dysentery bacteria may be seen to have invaded the dying and vacuolated entamœba, but in its pristine freshness, *E. histolytica* is a selective and dainty feeder, subsisting upon the tissue juices dissolved by its powerful proteolytic ferment, or upon ingested red blood corpuscles; never under such circumstances does it ingest bacteria.

In culture, however, whilst its morphological characters remain absolutely true to type—with its active travelling power of movement, its voluminous pseudopodia consisting of clear ectoplasm only, and its delicate nucleus, invisible in a saline preparation,—yet it now takes on an extraordinary power of ingesting and feeding upon bacteria. Under cultural conditions it will very readily ingest red blood corpuscles when presented to it, but its appetite now appears to have become depraved, and it feeds upon bacteria. (What so wonderful a change in the habits of this entamœba mean, it is difficult to say. It appears as if the entamœba, faced with an entirely new and unnatural environment, possesses powers of adapting its habits to this sudden change of environment; in the tissues, with the rich nutrition of digested tissue cells available, it subsists upon this source of nourishment; in culture, with no tissue available, bacteria become its prey. Every worker who has studied the subject will readily confirm Boeck and Drbohlav's observation that in culture *in vitro*—but not as it exists in the tissues of the colon mucosa—*E. histolytica* ingests bacteria. Yet it remains true to type as *E. histolytica*; it never simulates *E. coli* or any of the other human intestinal entamœbæ).

Using the methods outlined, the authors were able to cultivate two strains of *E. histolytica*; one kept alive through 152 sub-cultures from February 18th till October 1st, 1924; the second through 42 sub-cultures from July 2nd till October 1st, 1924. Throughout *E. histolytica* remained from first to last true to morphological type, whilst inoculation of the cultures into the rectum of kittens produced typical amœbic dysentery. One such kitten indeed developed not merely amœbic dysentery, but also liver abscess as the result. From these infected kittens the same entamœba was obtained in cultures on artificial media. Hench Koch's postulates were complied with, and the cultural strain proved to be identical with the original strain infective

to man. A sub-culture at the fifth month of sub-passage was still infective to kittens. At no time did the entamœbæ encyst, and all attempts to induce them to do so by exposing the cultures to different conditions of temperature failed.

There can be no doubt from the details of this work that *E. histolytica* can now be readily cultivated in artificial media *in vitro*. The story is carried a considerable step further by the publication in the *Journal of Tropical Medicine and Hygiene* of October 1st, 1925, Vol. XXVIII, No. 19, p. 345 by Drs. J. G. Thomson and Andrew Robertson, of a paper dealing with the cultivation *in vitro* of different species of entamœbæ of the human intestine by Boeck and Drbohlav's technique. These authors have succeeded with this technique in cultivating *in vitro* *E. histolytica*, *E. coli*, *Endolimax nana*, *Dientamœba fragilis*, and—probably—*Iodamoeba butschlii*. The following are some of their observations with regard to the motile forms of these entamœbæ as seen in culture:—

E. histolytica.—"When actively motile, *E. histolytica* became stretched out in a ribbon-shape with blunt, rounded ends. The ectoplasm, while clearly differentiated from the endoplasm, yet tended to maintain the general outline of the amœba. That is to say, the blunt rounded anterior end, consisting of the ectoplasm was the same width as the remainder of the body. Movement was usually more or less direct, not as in some of the other species, indeterminate, and the distance covered considerable. The nuclear structure was always of the same type as that found in man, but the body showed greater vacuolation and also contained ingested bacteria." (In brief, *E. histolytica*, in its actively motile, vegetative state, tends to travel across the microscope field, whereas the other species do not).

E. coli.—"They appeared to be very susceptible to changes in temperature and if placed on a slide which was more than three or four degrees below 37°C., they rounded up and withdrew their pseudopodia. When actively motile, they shewed a clearly marked differentiation between the clear hyaline ectoplasm and the coarsely granular endoplasm. In view of the old conception of *E. histolytica* having a much more clearly defined ectoplasm than *E. coli*, the large amount of ectoplasm shewn by the majority of the cultured *E. coli* was striking. They did not tend to progress across the slide, but moved about over the same spot, extruding their large, blunt, rounded pseudopodia in all directions. Their movement was, in comparison with that of the other species, sluggish and ponderous. The body was usually rounded and seldom adopted the wide ribbon or band-like outline of *E. histolytica*, and, if it did, it soon returned to the rounder or more compact shape."

D. fragilis.—"The movement is characteristic. Dientamœbæ do not tend to cover a great deal of ground, staying rather in the same position, extruding pseudopodia in an aimless fashion in all directions. The pseudopodia are pushed out suddenly, but not any great distance. In outline they are conical, and, as soon as the pseudopod has reached the extent of its travel, it usually widens, so that a flattened band of ectoplasm surrounds a considerable part of the circumference of the body.

From the wide, flattened, leaf-like pseudopodium, other conical processes may come out, still further accentuating the crenated leaf-like appearance."

I. butschlii.—"The movement is very similar to that described in the case of *E. histolytica*. The amœba is usually stretched out in an elongated form, and is rather wider towards its posterior end. The pseudopodia are blunt, about the same width as, or a trifle less than the width of the body, and are composed of clear hyaline ectoplasm. The direction of movement is chiefly straight, and if the amœba meets with an obstruction, it attempts to shove its way through, rather than withdraw and change its shape, as *D. fragilis* would do. The body is vacuolated and may contain bacteria etc."

E. nana.—"Just as the movement of the cultural *Iodamoeba* closely paralleled that of *E. histolytica*, so does that of *E. nana* bear a resemblance to that of *E. coli*. The amœba tends to remain compact, while the wide pseudopodia are extruded in aimless fashion in all conceivable directions. It changes its situation slowly, preferring to remain in one spot."

(It will be seen that we have in this series of published papers a most important set of contributions to the study of the entamœbæ of man, and to tropical medicine. Thus:—

(1) The possibility of cultural diagnosis replacing direct examination of the stools for the identification of infection with entamœbæ and flagellate protozoa.

(2) The study *in vitro* of the complete life cycles of the intestinal entamœbæ and flagellate protozoa of man, in connection with which several points require to be cleared up, such as, for example, the discovery of the method of de-excystation of the intestinal entamœbæ.

(3) The determination of the exact number of species of entamœbæ and of flagellate protozoa which parasitise the intestine of man; seeing that their complete morphology and differentiation may possibly be determined by their characters in culture.

(4) The study of the action *in vitro* upon the parasite of amœbic dysentery and amœbiasis of different drugs reputed to have a therapeutic action in amœbic infection in man, with a view to improving lines of treatment of the disease.

During 1925 at the Calcutta School of Tropical Medicine, *Embadomonas* has been once cultivated *in vitro* by Boeck's technique; *Enteromonas* on three occasions, *Trichomonas* and *Chilomastix* frequently, *Giardia*—so far—never; *E. histolytica* frequently. In fact a year's experience of the results of Boeck's methods has shewn that cultural diagnosis of the intestinal protozoal infections of man is not merely a feasible procedure, but possibly a better procedure than the direct examination of stale stools.

It is certain that this series of important papers on the cultivation of the entamœbæ of man *in vitro* will be followed by further investigation into these interesting and important parasites.)

The Uses of Kaolin.

We have received, through the courtesy of the Rev. Henri Monnier, Basrur, South Kanara, a copy of a MS. by Dr. Victor Kuhne, Laureate of the Faculty of Geneva, and formerly Chief of the Swiss Medical Mission to Serbia during the war, dealing with this subject. We understand that the original MS. has been submitted for publication elsewhere, whilst it is so enthusiastically in favour of the use of kaolin for a multitude of conditions that it is scarcely suitable for publication *in extenso*. Yet certain abstracts from it may be of interest to our readers, since there is no question as to the value of kaolin as a simple and cheap and reliable form of treatment in several tropical diseases:—

Clay, he claims, of which kaolin or porcelain earth is the purest chemical preparation, may almost claim to be a universal panacea, so many and so varied are its uses. It has been in use since the earliest dawn of medical history; Discorides of Cilicia, who lived about the dawn of the Christian era, describes five different kinds of clay in medicinal use in the 5th tome of his *materia medica*. Galen attributes its discovery to Hermes Trismegistes, the teacher of Æsculapius. Avicenne, most famous of Arab physicians (980 to 1039 A.D.), describes the various kinds of clay in medicinal use in his era. In the middle ages it came to be extensively used for all sorts of complaints, such as epilepsy and cardiac diseases, and not unnaturally fell into disrepute under such improper usage. Subsequently in slight demand as an excipient for pills and pastes, it has remained for Stumpf of

Wurzburg in 1898 to almost re-introduce this valuable medicament to the profession.

His attention to its value was first drawn by noting in 1882 that a corpse which had been buried for 37 months, and which was then exhumed for medico-legal examination, had been buried in a clay soil and was in a most extraordinary state of preservation. In 1886 he commenced to use clay as a paste in the treatment of old-standing septic wounds with most gratifying results as to deodorisation, protection from irritation, and healing. Chemically kaolin is silicate of aluminium, very stable in composition, insoluble in water, and not absorbed into the system on oral administration. Theoretically, unlimited quantities may be given by the mouth with no untoward results. The inhabitants of Tierra del Fuego are reported to eat from $\frac{1}{2}$ lb. to 1½ lbs. of clay per diem during the two or three months of their rainy season, when other sources of nutrition fail, and to shew no ill effects.

In 1900 Stumpf began the internal treatment of cases of cholera, dysentery and diarrhoea by oral administration of kaolin. During the period after the Treaty of Bucharest, when the Serbian armies returned to their homes, Dr. Kuhne was in charge of a cholera camp in Belgrade and also of a similar one at Nish. He records how there was introduced to him one evening "a small man, some 50 years old, who introduced himself as a Professor at Wurzburg,"—Dr. Stumpf, and begged to be allowed to treat the cholera cases with kaolin. Cases which were apparently desperate were handed over to him, with the result that next day they were not dead, but recovering. "I heard the little man repeating with a persistence truly Teutonic the word 'gout'—the Serbian for 'swallow'—to his patients, apparently under the impression that it was the equivalent for the German word *gut*, (good)." Persevering in this line of treatment, the mortality in these cholera camps dropped from 44 per cent. to 3 per cent. It proved far more efficacious than injections of anti-serum, injections of iodine, or hypertonic saline treatment. Also it was far more practicable.

Clinically, writes Dr. Kuhne, the immediate diagnosis of cholera from the symptoms shewn by the patient is of far more importance than to wait for a—possible—bacteriological diagnosis; one has to act at once. He writes that he has now adopted kaolin treatment in all general cases of intestinal disorder in place of iusmuth, charcoal, talc, etc. In the treatment of cholera, the following prescription is advocated:—

Into 250 c.c. of cold boiled water pour 100 gms. of finely pulverised kaolin. This is shaken until a perfectly homogeneous, yellow white creamy liquid is obtained. A tumblerful of this mixture is given to the patient orally every half hour or every hour to six or more doses. As a rule, after the sixth dose the patient falls asleep and all acute symptoms are over. The treatment is continued with smaller dosage over the next few days and the patient should be able to leave hospital in from 5 to 10 days' time. If it should prove impossible to administer the emulsion by the mouth it may be given by the stomach tube or by enema,—giving at least three litres of the suspension per dose in the latter case. When making the emulsion the kaolin should always be added to the water, and not vice versa. Other accessory treatment the author considers to be superfluous. For the first 18 hours after the admission nothing else should be given by the mouth except plain cold water.

The advantages of kaolin treatment—if it be as successful as the author claims—are obvious. It can be administered by anyone, even by the patient himself; accurate dosage is not necessary; in an hour a medical attendant can deal with a hundred patients; the treatment is not painful, is free from danger, and requires no special appliances; it can be used as a prophylactic measure; it is equally applicable to all forms of diarrhoea and dysentery; lastly, it is very cheap. Should

the true diagnosis be choleraic diarrhoea and not true cholera, only good and not harm is done.

In action kaolin probably owes its value to (a) adsorption on the surface of its fine molecules of toxins; thus, it is of great value in cases of food poisoning also; (b) its mechanical protective coating of the acutely inflamed gut. Finally, the range of therapeutic application of kaolin is not confined to intestinal disorders; it is of value in infantile diarrhoea; as a local application in diphtheria of the throat and on burns; for local treatment in leucorrhoea and in vaginal and uterine inflammation; and lastly, for disinfection of the surgeon's hands before operation, where thorough rubbing of the hands with purified kaolin will—it is believed—remove all septic infection from the skin without causing the irritation of the skin so common with the use of the usual surgical antiseptics.

(Dr. Kuhne's article, as may be gathered, is very much on the laudatory side. Personally we have now been using kaolin in the treatment of intestinal disorders for some two years—especially in the treatment of bacillary dysentery. Morson's electrically precipitated "Osmo-kaolin" is probably the best preparation. It may be said that such treatment is exceedingly well tolerated by the patient; is often very successful from a clinical point of view; and is a measure of distinct therapeutic value. The usual dose given is two drachms suspended in water or milk every four hours during the acute dysenteric phase).

On sending Children to Jail.

FROM time to time, in our columns devoted to reviews of annual reports, we review those from different Inspectors-General of Prisons of different provinces in India. For several years past they have dwelt especially upon one terrible and constant inhumane practice in legal procedure in India; the sending to jail of children or young juvenile offenders against different sections of the Indian Penal Code. No one defends this practice; everyone admits the urgent necessity for reform; but—as usual—"financial considerations are of paramount importance." It is nevertheless high time that this old standing iniquity was remedied. It is one which must have come prominently to the notice of every jail superintendent in India, i.e., of nearly every civil surgeon in India; yet little or nothing is done to remedy it.

In an address to the Bengal Presidency Council of Women in the Council Chamber at Government House, Calcutta, on the 10th December, 1925, Lieutenant-Colonel W. G. Hamilton, I.M.S., Inspector-General of Prisons, Bengal, summarised the whole position in an important and forcible address. The following abstract of his lecture is taken from *The Statesman* for the 11th December, 1925:—

"The Government of Bengal strongly disapproves of the practice of imprisonment of children for petty offences, but unfortunately funds have not been available to make the Children's Act effective. We are all proud of our connexion with this great city of Calcutta and we like to think and speak of it as the second city of the Empire. I am afraid, however, that in our treatment of the youthful offender we are a long way behind Madras, which ignorant people (usually those who have never been there) refer to contemptuously as 'the benighted Presidency.'

"Young children of seven, eight and ten years of age in Calcutta have been sent to prison for the most paltry offences. Your own council reported one case of a little girl who was sent to the Presidency Female Jail. I could quote several similar cases, but will only mention three which I came across about two weeks ago during a casual visit to the Juvenile Jail. I saw one small boy about eleven years old, and asked what was his offence and what sentence he was undergoing. To my surprise I found that he was convicted under section 109 of the Criminal Procedure Code, a

section that is usually enforced in the case of notorious habitual criminals who have no ostensible means of livelihood and are suspected of living a life of crime, and unless they can get someone to be surety for their good behaviour they are committed to prison, usually for six months or a year's simple imprisonment.

"On inquiry I found that this small boy had one previous conviction, probably no friends. It would be impossible for him to get any one to go surety for his good conduct. It is very difficult to understand how such a case can be committed under section 109. But that is not all, he cannot be sent to a reformatory school because it cannot take cases committed under this section. That means that unless he is released by Government he will have to undergo six months' simple imprisonment. To my mind, so-called simple imprisonment is the most pernicious form of imprisonment, it means that the prisoner is not compelled to work. Can you imagine anything more demoralising and degrading than for a boy or man to idle, doing nothing for six months or a year? It is true that in the Juvenile Jail we make them go to school but we cannot teach them any useful work or trade unless the prisoner consents to do it. I have reported this case to Government, I hope action will be taken.

"The other two cases are examples of committal to prison for breaches of local Police Acts, not criminal offences in the strict sense at all. These cases are usually for street obstruction, gambling in the street, begging, being in charge of bullocks or horses with sores on their back or which are lame, etc.

"The two cases I had reported to me were two little boys of about 12 years of age, they were convicted of street obstruction and were sentenced to a fine of eight annas or in default six days' simple imprisonment. These short sentences are absolutely useless. I cannot imagine anything more futile than to send a child to prison for three or four days. It is neither deterrent nor reformatory. It seems a deliberate attempt to accustom a child to jail and to turn him into a professional criminal. If we send young children to prison for such paltry offences, I do not think we have made much advance on the days I described of 1735, one hundred and ninety years ago.

"Magistrates say 'What are we to do, we disapprove of imprisonment of young children as much as you do, but until the Children's Act is brought into force we have no other alternative than to commit children to prison. Sometimes they have been let off with a warning and again they commit an offence. If we discharge them, the law is a farce.'

"I fully admit that it is the system that is at fault, but surely it should not be beyond human ingenuity to devise some other means than imprisonment for convicting young children who beg, obstruct the pathway or gamble in the streets. I cannot help thinking that if it was possible for social workers to attend the Police Courts and inquire into every case of a child brought up before a magistrate, it would be possible in many cases to avoid the evils of imprisonment. I am not a sloppy sentimentalist who deprecates the conviction or punishment of erring juveniles. I am a strong believer in children being put under discipline. I think many of the troubles of the present day are due to the lax control of children by their parents. But we should be rational and humane in our methods and not fall back on the obsolete system of sending little children to prison for every petty breach of a local law, or Police Act.

"I confess that in the past the Juvenile Jail has been too much a penal institution and not enough was done to try to reform the boys committed to jail. The school-rooms were dark and badly ventilated, the cubicles for sleeping were miserable hovels, dark and forbidding. Some unsuitable forms of labour for boys were in force, such as oil-pressing and wheat-grinding. The principal industry, quinine-tablet making, was useless to them after discharge from jail. Ordinary prison clothing was worn by the inmates. Some of

the jail punishments were not in conformity with modern ideas for the correction of the youthful offenders.

"During the past year I have abolished oil mills and wheat-grinding. The quinine industry has been removed, the rooms formerly used for the manufacture of quinine—which are bright and well ventilated—have been converted into school-rooms and the old school-rooms are now used as dormitories. Ordinary jail uniforms have been replaced by a special uniform which is different from the old pattern. In future it is proposed to run the jail on modified Borstal lines.

"A list of special rules has been drawn up and submitted to Government for approval. I hope to develop the recreative side of the jail, to encourage manly outdoor games, and also to get permission to allow lectures and instructional lantern or cinema exhibitions. His Excellency visited the jail about a year ago, I showed him the sleeping cubicles, he condemned them as unfit. The cost of reconstructing these cubicles into more suitable dormitories will be about Rs. 70,000. Recently the Legislative Council passed a vote for Rs. 45,000 to start the necessary alterations. Although we have made these few improvements during the past year, there are still many serious defects which should be remedied.

"Under-trial prisoners are sent to this jail. There is no separate accommodation for them and it is difficult to separate them completely from those who have been convicted.

"Juvenile offenders under trial should not be sent to a jail at all, even a juvenile jail is objectionable. There should be sufficient remand homes to accommodate all the juvenile under-trial offenders of Calcutta, and the suburbs.

"I hope it will be possible to provide sufficient remand homes and thus do away with the present objectionable habit of keeping boys under trial in a jail.

"Some arrangement should be made for a separate yard or division of the jail to accommodate star class prisoners. The whole object of this class is to keep them absolutely separate from those of more criminal tendencies. We hope in the future to start a Borstal Institution for adolescent criminals at Bankura. It is proposed to convert the present district jail for that purpose. Special legislation will be necessary to enable courts to commit suitable cases direct to the Borstal Institution. Probably a Bill on the lines of the Madras Borstal Bill would be suitable.

"There are several other points such as the provision of more children's courts. The children's court in Lower Circular Road only deals with a comparatively small number of the youthful offenders in Calcutta. Magistrates with special qualifications for dealing with children should be selected.

"The Salvation Army have offered to run a Home for 50 boys and 50 girls convicted under the Children's Act 1922. The estimated cost is Rs. 1,100 per mensem or Rs. 13,200 per annum. This home I take it would be a certified school under the Act. I think if Government approved one scheme and could find the money, the great obstacle in the way of prevention of imprisonment of children would be removed.

"One of the most important problems of the youthful offenders is their after-care on discharge from a jail or Borstal Institution.

"What is needed in Calcutta is a special After-Care Association for juvenile offenders. It should be run on the lines of the Borstal associations of England or Madras. I want you all to realise that however much we may improve our jails in the future and however much we may reform our young criminals, all our money and efforts will be thrown away unless there is some society to give them a helping hand when they are discharged from prison or a Borstal Institution. Otherwise they will be driven by circumstances to relapse into crime and return to jail. Their real punishment will begin when they are released from jail unless there is someone to look after them."

Prophylaxis of Whooping-Cough.

British Medical Journal, May 30, 1925.

V. GILLOT (*Bull. Acad. de Med.*, February 10th, 1925, p. 176), has had recourse to a new and very simple method which consists in subcutaneous injection of whole blood into children who have been exposed to infection. The blood may be taken from a person who has had whooping-cough at some time in his life, or from one of the parents without troubling to inquire if they have had whooping-cough or not. During a severe epidemic of pertussis at Algiers in 1924 Gillot employed this method at the children's clinic with the following results: (1) All the children who were injected before the period of invasion were protected against the disease. (2) Those who were first injected at the onset had very mild attacks. One injection was given, the dose ranging from 2 to 5 c.cm.

Quinine Bihydrochloride Combined with Pituitary Extract in Labour.

By T. J. RYAN.

(*Practitioner*, June 1925, p. 438.)

THE remarks deal only with normal vertex presentations.

Having made certain that no obstruction to delivery exists, and then having considered it wise to hasten delivery, two alternative treatments are suggested. First, to give of. ricini 1 oz., followed by a hot drink, two hours later an enema of soap and water, one hour later a cachet of quinine bi-hydrochloride grs. v, the latter to be repeated every two hours till grs. xv have been administered. If labour does not come on strongly, hot fomentations applied over the abdomen usually bring on strong labour pains.

When the os is the size of at least half-a-crown (but not before), give a deep intra muscular injection of pituitary extract, 1 c.c. Full dilatation usually occurs speedily with an uneventful delivery.

The second all-Bengal Kala-Azar Conference.

At the opening of the conference, His Excellency Lord Curzon, the present position of the Government of Bengal with regard to the ravages of kala-azar in the Province. The following abstract of his address is taken from *The Statesman* of the 22nd November, 1925:—

In addressing the conference, which was attended by several hundred members, including many prominent Government officials, His Excellency said it was not until about 20 years ago, that investigations, which had been going on for some time previously, established the existence of kala-azar as a disease distinct from malaria, and a satisfactory treatment for dealing with it was discovered so recently as 1915.

"It is only in comparatively recent times," he continued, "that public attention has been focussed upon the problem. Its symptoms are known to be very similar to those of malaria and the discovery of a treatment in 1915 was a factor of far-reaching importance, as it has brought the subjugation of the disease within the realm of practical politics, provided of course that the agencies for using that treatment can be adequately organised. Indeed the success of the treatment may be judged by the fact that whereas previously 96 per cent. of the cases were fatal, 95 per cent. of those treated now recover.

"The knowledge of its symptoms and the discovery of a comparatively easy guaranteed treatment naturally resulted in a large increase of reported cases and this fact, coupled with the usual human tendency to magnify the importance and seriousness of any new discovery, naturally led to alarming views as to the prevalence and possibilities of the new disease. In saying this, I have no desire to underestimate the importance of the problem or the necessity for concentrating attention

upon it, but we must guard against the mistake of regarding it as the only, or even the chief, problem with which we have to deal, to the exclusion of the many other problems connected with public health.

"Malaria is still the root problem disease in Bengal, but with that terrible scourge undermining the health of so large a proportion of the population, everything that is humanly possible must be done to prevent the addition of another serious epidemic fever. At one time kala-azar threatened to become an even more deadly enemy to health than malaria, but the discovery of a sure remedy has rendered the problem of its treatment mainly a question of organisation and that is why such a conference as this is so particularly valuable. How can we best utilise our resources; how can we best train men to handle the remedy, how can we most most effectively bring the remedy within reach of the sufferers? These are the kind of questions which you have to consider and your discussion of these matters will be of the utmost value.

"A problem of so vast a nature as this is incapable of solution by the efforts of Government alone. Government can do no more than carry out research and train men in the treatment of the disease. Government, through its officers, can investigate the prevalence and scope of the disease and undertake the research work necessary for discovering its causes, the conditions favourable to its growth, the steps which will prevent its development and the treatment which will cure it. This is perhaps the best service we can render. We can also provide facilities for training doctors and other workers in the methods which experience has found effective, and thus supply the pioneers in the practical work of treatment. Men so trained will be able to point the way in the initial stages of the disease and advise local workers in the light of their own experience. The ideal we should aim at, I think, is the establishment of a model anti-kala-azar centre in each district head-quarters. Having laid the foundation in this way, Government must necessarily leave it to honorary workers and local organisations to amplify the work on an extensive scale and carry it into every village.

"To what extent has the Government of Bengal hitherto carried out its obligations in this matter? In the first place they carried out a survey which gave us a rough idea of the prevalence of the disease and the areas mainly infected. They have undertaken research work, which has made known the symptoms and nature of the disease and the treatment most successful in curing it. They have drawn up a scheme of anti-kala-azar measures, and by insisting on the appointment of District Public Health Officers they have enabled a beginning to be made with a sound scheme for the treatment of the disease. Facilities are provided at the School of Tropical Medicine or under Civil Surgeons or Health Officers with recent experience of kala-azar work for training medical officers who may be deputed there by the local bodies.

"The Public Health Department has an Assistant Director with a staff of 4 assistant and 17 sub-assistant surgeons who, though not engaged solely in kala-azar work, carry out inspection in districts and advise local agencies in their work. Lastly, the Government has given financial assistance to local organisations engaged in the campaign. It is for you now to consider what further assistance Government can render and in what way local efforts may best be encouraged and directed.

"It would appear to be both economical and effective for the local agencies and voluntary workers to carry on the work under the continued guidance and supervision of the Public Health Department on the lines which experience has found to be most effective, and I am glad to say that in recent years several local bodies and organisations have shown a very practical recognition of their responsibilities and have done excellent work in combating the disease. I desire in particular to express my sincere appreciation of the work of the Central Co-operative Anti-Malarial Society.

This Society had 67 centres in operation for the voluntary treatment of villagers in 1924 and the Bengal Health Association has 24 kala-azar centres. Government have been able to give both these Societies grants during the last two years to help them with their work. Various District Boards also have shown a commendable enthusiasm in the furtherance of the campaign.

"The fact that this problem now arouses such keen interest in the public justifies the hope that in the next few years the combined efforts of Government and local bodies will not only stop the spread of this disease but greatly reduce its present incidence. The Co-operative Anti-Malarial Society and the Bengal Health Association have already done splendid work, and I have no doubt that with further assistance they will be able to expand their present activities. The grants of Rs. 30,500 which we made this year have been so well utilised that we have the strongest grounds for increasing them, and we have now under consideration the question of obtaining a larger provision in next year's budget for the purpose of assisting the two associations and the local bodies in their splendid work.

"There is still a very great deal to be done both by Government and by other agencies, and I would urge those associations and bodies to take heart in the knowledge that their work is appreciated and will be supported. Government on its side will continue to give the utmost possible financial assistance, to provide facilities for training medical officers, inspection and guidance, and they will undertake further research work. We have still to discover the vehicle by which infection is conveyed, and it is to be hoped that the expert commission which was appointed by the Government of India last year to investigate this aspect, and towards the expenses of which like other Governments we made grants, will succeed in identifying the vector. If they are successful, the administration of medical treatment and the general scheme of operations will be very greatly benefited by the discovery."

Sir Kailash Chandra Bose, Kt., C.I.E., O.B.E., President of the Central Co-operative Anti-Malarial Society, in thanking His Excellency for his continued interest in the conference, said:—"Malaria is alone responsible for enfeebling the Bengali race; it has indeed sapped out the vitality of the nation. It has depopulated our *Sonar Bangla*. Most of my friends would require an interpretation of the phrase *Sonar Bangla*. During the full harvest the paddy fields cultivated by a sturdy and healthy race of peasants looked like a canopy of gold spread over the earth. It might be also explained that our paddy brought to us gold and diamonds. The peasantry is almost now annihilated. Malaria has almost deprived us of our agricultural prosperity. It has virtually impoverished us in our national wealth. Infant mortality, premature decay, sterility, and untimely death prevent the people reaching their ancient old age. 'Malaria is the chieftain of diseases,' for the average life of Indian is only 22 years now. Much of our peasantry still left after the ravages of malaria is threatened with extinction by attacks of her offspring kala-azar.

"Malaria is the cause of the perverted state and degraded mentality of the people of Bengal. To eradicate malaria should be the order of the day. We all know that timely kerosinisation annihilates the species of anopheles which are responsible for the spread of the disease, and the suspension of the process favours the growth and outbreak of malaria. When kala-azar breaks out in a village in an epidemic form, we can easily check its progress by a systematic and simultaneous treatment of the people affected in a centre started on co-operative principles."

"Caprokol."

"CAPROKOL" is hexyl-resorcinol, prepared by the British Drug Houses, Ltd., and introduced into medical

practice as a new, reliable and efficacious urinary antiseptic. The attention of the medical profession to the value of hexyl-resorcinol was first drawn by Dr. R. B. Henline in a paper published in the *Journal of Urology* for August, 1925. This substance may be said to fulfill all the requirements of the ideal urinary antiseptic better than any other at present known; it is stable in composition, being a white solid, withstanding repeated distillation under diminished pressure; it is bactericidal in high dilutions in urine of any reaction; when administered by the mouth it is non-toxic; it is non-irritating to the urinary tract; it is eliminated in high percentage by the kidney, and a continuous flow of bactericidal urine is secreted not infrequently for as long as 24 hours, following a single dose of hexyl-resorcinol. Finally, it may be given in repeated doses for indefinite periods with safety.

With the guarantee of the British Drug Houses behind it, this new product should prove of great interest to the medical profession in this country. It is prescribed, either for adults in flexible gelatine capsules each containing 0.15 grm. of caprokol in a 25 per cent. solution in olive oil; or for children in a 2½ per cent. solution in olive oil, the dose being taken floated on milk. The dose for an adult should be at first 2 such capsules, immediately after each meal; later increased to 3, or a maximum of 4 capsules, t.d.s. It should be taken either immediately after food, or after a glassful of milk. Fluid intake should be in general restricted, and alkalies are contra-indicated with it.

Some of Dr. Henline's results are of very considerable interest. In 26 cases of *B. coli* infection, the average duration of infection was 3.7 years; except in two cases the urine became bacteriologically sterile on culture in an average of 63.5 days of caprokol treatment. In 12 cases of infection with staphylococcus, streptococcus, *B. proteus* and the like, the average duration of the infection was 2½ years; after caprokol administration was begun the urine became culturally sterile in an average after 50.7 days' treatment. He concludes as follows:—

1. The necessity for a complete urological examination in infections of the urinary tract, including cultures, kidney functional tests, and complete x-ray pictures, is of the utmost importance before any treatment is instituted.

2. Hexyl resorcinol is an effective internal urinary antiseptic administrable by the mouth, non-toxic, non-irritating to the urinary tract and a valuable aid in the treatment of urinary tract infections. It is apparently superior to all other urinary antiseptics described.

3. Hexyl resorcinol is bactericidal for all the usual organisms infecting the urinary tract. An average of 63.5 days for *B. coli*, 18 days for *Staphylococcus aureus*, 94.5 days for *B. proteus*, 91 days for *B. lactis aerogenes* and 133 days for mixed infections was necessary to sterilize the urine. Only one case recurred, and in this one treatment was discontinued too soon. Ninety-two per cent. were cured. Of the three which were not cured, one did not return for treatment, one still had a growth of *B. fluorescens*, and one was complicated by a bladder tumour. These three are clinically cured.

4. The duration of the disease apparently has no bearing on the length of time necessary to affect a cure, providing the renal parenchyma has not been damaged.

5. Hexyl resorcinol, by thorough disinfection of the urinary tract, is an aid in preventing recurrent stones.

6. In post-operative urological cases, hexyl resorcinol is an aid in healing wounds in streptococcus infections.

7. The series of cases of gonorrheal urethritis is too small for definite conclusions, however hexyl resorcinol is apparently of little if any value in the treatment of gonorrheal urethritis in the male.

Reviews.

THE LIFE OF SIR WILLIAM OSLER.—By Harvey Cushing. Vols. I and II. Oxford: Clarendon Press, 1925. Price, 37s. 6d.

WILLIAM OSLER, the youngest son of a parson with nine children, was born at Bond Head in Canada on July 12th, 1849. He was sent to Weston School; in that he devised every possible means of avoiding his school work, he was a thoroughly bad boy; he was, however, a great athlete. Even in these days he showed a great interest in biology. He entered Trinity College, Toronto, with the intention of going into the Church, but abandoned this intention and entered the Toronto Medical School in 1868. His main interests were biology and anatomy and had he come under the influence of, say, Huxley it seems probable that he would have abandoned medicine altogether in favour of biology, as it was apparent that lectures bored him. In 1870 he left Toronto for the McGill Medical School where in 1872 he took his degree. In the same year he visited Great Britain for the first time. During his first visit he spent his time visiting hospitals and gaining practical experience; in one of his letters home he wrote protesting against the practice so common amongst his countrymen of spending their time grinding to pass English examinations. However at a later date he himself succumbed and took his M. R. C. P. From London he went on to Berlin and thence to Vienna. In Berlin he was much impressed by the post-mortem demonstrations of Virchow, but was not impressed by the German capital itself; on the other hand Vienna as a town impressed him, its general sanitary condition standing out in marked contrast to that of Berlin, but he was not impressed by its post-mortem demonstrations. He returned to Canada in 1874 and took up an appointment at McGill University; here he was at first a teacher of medicine and later, pathologist. The following year he had small-pox. His great interest in pathology developed, especially in relation to the autopsy room, and his first published volume was a collection of pathological reports which he dedicated to Dr. James Bovell, M.D. In 1878 he was again in London for a short time.

As a physician to the Montreal General Hospital he was allowed to carry on a consulting practice but apparently he did not encourage these consultations, and the students who lived with him at the time are reported to have said that they can only remember three consultations having taken place in his rooms. It was said of him that "he had the greatest contempt for the doctor who made financial gain the first object of his work" and "even seemed to go so far as to think that a man could not make more than a bare living and still be an honest and competent physician." He remained at Montreal until 1883; during this period he was made a Fellow of the Royal College of Physicians, London. He again visited Europe in 1884, made the acquaintance of Koch and again met Virchow. He now left his appointment at Montreal and went to Philadelphia.

In 1889 he was appointed to the Johns Hopkins Hospital, he visited Europe once more in the following year and in 1891 he commenced his *magnum opus* which appeared in 1892. The Medical School of the Johns Hopkins University was opened in 1893. In February 1900 he was virtually offered the vacant chair of Professor of Medicine at Edinburgh; this after much hesitation he very reluctantly refused. In 1904 he accepted the Regius Professorship at Oxford which he held until his death.

He married in 1892. His son, Revere, was born in 1896 and was killed in France in August 1917. He was

made a baronet in 1911 and died at Oxford on December 29th, 1919.

Sir William was not only a great physician, probably the greatest of his day, but a writer of considerable merit and one of the wisest advisers of his day on practical affairs of all sorts.

As the writer of the "Life of Sir William Osler" says, little pretence has been made to do much more than let his story tell itself as far as possible through what he has put on paper. It is the simple story of a great man well told.

MEDICINE MONOGRAPHS, VOL. IV, CALORIMETRY IN MEDICINE.—By William S. McCann. Baltimore: Williams and Wilkins Co., 1924. English Agents, Messrs. Baillière, Tindall & Cox: London. Pp. 98. Price, 11s. 6d. net.

THE author deserves the thanks of the profession for bringing out this practical book on calorimetry, a science which has made so much progress during the past few years. A working knowledge of calorimetry and its practical application to every-day problems in the diagnosis and treatment of diseases, especially those of the ductless glands, for example Grave's disease, or of metabolic diseases like diabetes, are essential now-a-days for the scientific and successful practice of medicine.

The author discusses the subject of basal metabolism, giving normal standards for adults and children and in pregnancy also. He then goes on to discuss the importance of determination of the basal metabolic rate in various diseases (thyroid disease, fever, anæmias and lukæmias and other miscellaneous pathological conditions).

The action of the thyroid extracts, of epinephrin, insulin, pituitary extracts, of the many antipyretics and some of the more important alkaloids and other drugs on the basal metabolic rate is ably discussed in the book and will amply repay perusal.

We recommend this useful book to practising physicians who will find it helpful in dealing with such diseases as hypothyroidism, malnutrition, anæmia, obesity, fevers, cardiac and nephritic diseases.

MEDICINE MONOGRAPHS, VOL. V, DYSPNŒA.—By James Howard Means. Baltimore: Williams and Wilkins Company, 1924. English Agents, Baillière, Tindall & Cox, London. Pp. x plus 108, with 22 figs. Price, 11s. 6d. net.

THE significance of dyspnœa, its bearing on the diagnosis, treatment and prognosis of many diseases, the detailed analysis of the physiological causes giving rise to this important symptom are all of considerable value in practical medicine, and the physician would be lacking in his duty to the patient, if he does not try by all the methods of observation open to him to elicit the true cause underlying this distressing symptom. The author has carefully interpreted the latest facts which have been brought to light during the past few years and has attempted to scrutinize the various important factors, structural and functional, which directly or indirectly play a part in the production of this symptom.

The author has ably discussed the subject in relation to:—

- (a) dyspnœa associated primarily with increased metabolism,
- (b) dyspnœa associated primarily with disturbance of acid base equilibrium,
- (c) dyspnœa associated primarily with difficulty in oxygen transport,
- (d) dyspnœa associated with mechanical and nervous hindrances to the respiratory movements,
- (e) cardiac dyspnœa, and
- (f) the dyspnœa of pneumonía.

We feel sure that this book will be of great value to all students of medicine.

THE DIABETIC LIFE—ITS CONTROL BY DIET AND INSULIN.—By R. D. Lawrence, M.A., M.D. London: J. & A. Churchill, 1925. Pp. 161, with 10 illustrations. Price, 7s. 6d. net.

THE author's object in writing this little book is to furnish to general practitioners and patients (whose co-operation is essential in the successful treatment of diabetes) certain useful information regarding the modern treatment of diabetes by diet and insulin. He lays down a few simple rules of treatment which it would profit the busy general practitioner to remember and to follow, and by which an intelligent patient would benefit himself and help his doctor considerably by following the simple rules laid down for him.

The "Line-ration" scheme of dieting which the author has devised is ingenious and quite simple to follow; it is likely to help an intelligent patient to select a suitable diet for himself according to his own habits and taste.

We have no doubt that the book will prove helpful to both doctors and patients.

BUCHANAN'S MANUAL OF ANATOMY, INCLUDING EMBRYOLOGY.—Edited by E. Barclay-Smith, M.D., J. E. Frazer, F.R.C.S., F. G. Parsons, F.R.C.S., and W. Wright, F.R.C.S. Fifth Edition. London: Baillière, Tindall & Cox, 1925. Pp. 1702, with 810 illustrations, mostly in original and in colours. Price, 35s. net.

THE last edition, which appeared six years ago, was to all intents and purposes a reprint of the preceding edition. The present edition has been revised and considerable portions of the previous text have been rewritten. The general arrangement of the work has however not been substantially altered. Many new illustrations have been incorporated. The illustrations, though perhaps missing the artistic excellence of those to which we were accustomed in the older editions, are very clear, sufficient and self explanatory.

Since it deals with anatomy regionally the work must appeal especially to the student, whilst an excellent index enhances its value from the point of view of those who wish to use it as a work of reference.

The practical guide to dissection has been omitted from this edition and will be published as a separate volume.

Perhaps the greatest change is in the section dealing with embryology, with which the book commences in a chapter outlining the elements of the subject. A description of the development of the various organs is given in greater detail under their appropriate headings; the descriptions are full enough but not tediously long, in short they are just what the student requires and no more.

Last but not least the old terminology is adhered to.

We consider the work a very sound investment for the student.

SCHISTOSOMIASIS VEL BILHARZIASIS.—By C. G. Kay Sharp, M.D., with a foreword by J. B. Christopherson, C.M.G., M.D., F.R.C.P., F.R.C.S. London: John Bale, Sons and Danielsson, Ltd., 1925. Pp. 74. Price, 7s. 6d. net.

THIS is a useful little treatise on schistosomiasis as it occurs in Natal and Zululand, for medical practitioners and educationists who have to deal with the problem. Dr. Sharp gained his experience of the disease in the schools of Natal, and as most of the cases are first contracted in childhood the school offers one of the best means of investigating the disease, and the best field for a fight against it. In his foreword Dr. Christopherson places the prophylactic measures in the following order: (1) mass treatments in schools and villages, and treatment of individual cases wherever encountered, (2) educational propaganda to check infection and re-infection, and (3) destruction of snails in local infected collections of water.

Dr. Kay gives a brief historical résumé, after which he deals with the etiology, pathology, incidence, diagnosis, treatment and prevention of the disease. In one Indian school in Natal 40 out of 300 children were passing ova in the urine. In Durban schools 3.4 per

cent. of the male children are infected, on the basis of recorded cases only. Native women are much less affected than the men owing to their not bathing in public bodies of water. In his recommendations for prevention of spread of the disease Dr. Sharp urges that notification of schistosomiasis be made compulsory, and that free treatment be provided for. In Natal the prognosis is good, and deaths certified as being due to schistosomiasis are rare. The last chapter gives a review of the literature on treatment of African forms of schistosomiasis.

HAND-ATLAS OF CLINICAL ANATOMY.—By A. C. Eycleshymer, B.S., Ph.D., M.D., and Tom Jones, B.F.A. London: Henry Kimpton, 1925. Pp. 424, with 395 line drawings, mostly in colour. Price, 50s.

THIS almost sumptuous work is in every way admirable. It is the outgrowth of a special *Manual of Surgical Anatomy* prepared during the War for officers in the Medical Corps of the U. S. A. Army and Navy. The original edition of 3,000 copies was soon extended to 10,000 copies and even this failed to meet the demand. In the present atlas the anatomy of the female has been included, and some 107 new drawings added. The authors are respectively Director of Anatomy and Director of Anatomical Illustration in the University of Illinois.

The four sections of the book deal with the head and neck; the thorax, abdomen and pelvis; the upper extremity; and the lower extremity. The illustrations are, as far as possible, so arranged as to present (a) transparencies—in which are viewed the various deeper structures in their natural positions as though the overlying structures were transparent; (b) systematic dissections; (c) regional dissections; (d) sections, shewing the relationship of structures in sagittal, frontal and transverse sections; whilst finally (e) a special section deals with surgical incisions, shewing the typical incisions and the more common sites of surgical attack. A series of drawings of muscle projections, shewing the muscles in relation to body outline and bony structure, is an original and most valuable part feature of the book.

The illustrations are almost all in colour, are admirably clear and well executed. Conciseness, regional arrangement and quick adaptability for the surgeon's needs are special features of the book. A very complete explanatory index renders a descriptive text unnecessary, and facilitates quick reference.

We have nothing but praise for this very ably executed work. It should be in the hands of every anatomist and surgeon.

THE CRIPPLED HAND AND ARM.—By Carl Beck, M.D. London: J. B. Lippincott Co. Pp. 243, with 302 illustrations. Price, 30s. net. Obtainable in India from Messrs. Butterworth & Co. (India), Ltd., P. O. Box 251, Calcutta. Price, Rs. 22-8.

AS the title suggests, though written primarily for the surgical specialist, this work is well worth including in the library of the general practitioner, since, as the author points out, the patient's chances of regaining the usefulness of the damaged member are directly influenced by the first treatment meted out to him by the general practitioner, to whom in the first instance these injuries are brought.

It is a remarkable book, and contains a wealth of technical detail and clinical illustration; if one may make a criticism it would be to suggest that the work would have been even more valuable had the author placed the discussion of general principles more clearly in the foreground, and used his clinical material to illustrate the principles as they were enunciated. As the work stands one is a little in danger of losing sight of the forest from the multitude of the trees.

From the point of view of the surgeon in this country the section of the book dealing with the crippling of the hand by burns will be found the most useful; probably in no country in the world are more grievous

deformities of the hand and arm met with due to this cause than in India.

The section relating to disabilities and crippling due to mutilation emphasises the importance of preserving every scrap of tissue which will survive for the subsequent scheme of reconstruction; even the smallest fragment of a phalanx may add to the usefulness of the remodelled hand.

The section on technique, which might with advantage be expanded, draws attention to the usefulness of the sliding flap, and to its great superiority over the Wolff graft or the Thiersch graft. Some very ingenious methods of reconstructing tendons are given in this portion of the work.

In the chapter dealing with the hand crippled from birth there is related a really remarkable construction of a useful hand from an inert stump, and in a subsequent chapter the account of a reconstruction as remarkable from the stump of a hand crippled from injury.

For Dupuytren's contracture the author recommends the radical procedure of excising the whole of the skin covering the palm of the hand and replacing it with a pedicled flap. The remedy is heroic but in common with many heroic remedies is probably more satisfactory than a number of half-hearted and partial measures in the long run.

We can cordially recommend the work to anyone whose practice brings him many of these cases of mutilation and deformity to treat.

PITFALLS OF SURGERY, SECOND EDITION.—By Harold Burrows. London: Baillière, Tindall & Cox. Pp. x plus 525. Price, 12s. 6d. net.

THE first edition of this book was published in 1922, and was the subject of a good deal of comment. It fell into the hands of the lay press and somewhat sensational copy was extracted. The title of this book has been altered to the above.

As the author puts it—"Attention has been given only to actual occurrences, on the simple and sure ground that what has happened once may come about again." The book cannot fail to be of interest to the surgeon, and also of value, in that he can find here a multitude of mistakes which have actually occurred to others. One sees here mistakes in diagnosis emphasised, which one meets with in the practice of surgery, but which one never finds mentioned in the ordinary literature. The book is especially useful to the beginner. For example, the author gives a long list, which in the nature of things must be incomplete, of diseases which have been diagnosed and operated on for appendicitis. To the beginner some of these will be new, the man of experience could add to them. Much advice of great value is to be found. The book should find a place in every surgeon's library.

There is one serious publisher's error, viz., from page 481 onwards the pages are misplaced, e.g., after 481 comes page 500, then page 497 and so on. Seven or eight pages are missing. In fact from page 481 to 513 it is impossible to understand the text as the sequence is lost.

LISTER AND THE LIGATURE.—Compiled by the research readers of the Scientific Department of Johnson and Johnson, New Brunswick, N. J., U. S. A. Pp. 94. Illustrated.

THE authors of this little book state that, having lived through the years covering the re-introduction and re-birth of surgical ligatures and sutures, they have put together the story of this, one of the very greatest of events in the progress of surgery.

The first portion of the book covers briefly the period before Lister. Ligatures—even catgut ligatures—were no new story, even in ancient surgery. From time to time they would be introduced; but as their use was invariably attended with sepsis and severe secondary hæmorrhage, their use would die away again for a time until they were re-introduced, again as a novelty.

Lister's introduction of antiseptic—later of aseptic—surgery, however, revolutionised the position; and here, in the main portion of the book, the authors have collected together a most valuable compilation of Lister's publications on the subject together with a full bibliography. Many of Lister's original papers are now inaccessible, and in thus presenting them collected together, the authors carry out a valuable service to the surgeon and to the student of medical history.

Lister's original drawings are reproduced, and the illustrations also include a portrait of Lord Lister, a picture of his famous carbolic spray apparatus, and of the Lister medallion in Westminster Abbey.

This book cannot compare with Sir Rickman Godlee's immortal study of Lord Lister; but it is a useful and valuable publication.

THE SCIENTIFIC AND OTHER PAPERS OF RAI CHUNILAL BOSE BAHADUR, C.I.E., I.S.O., M.B., F.C.S. VOL. II.—Edited by J. P. Bose, M.B., F.C.S., Calcutta School of Tropical Medicine. Pp. 558. Price, Rs. 5.

THE first volume of these collected papers was reviewed in our issue for October, 1924. The papers in the second volume deal with many important subjects; with hygiene and public health; the temperance question; biographical sketches; popular scientific lectures; and social problems. Together they form an important, non-technical and thoughtful contribution to many of the most important public health and social questions of the day in India.

A reprint from the *Calcutta Medical Journal* of 1910 deals with the measures necessary for the prevention of food adulteration, an exceedingly important problem in India. An essay on common Indian foodstuffs is followed by an admirable one on practical hints for the improvement of the dietary of Bengalis; this last indeed is a chapter which should be read by all medical men practising in Bengal. The milk supply of Calcutta is dealt with frankly and with no attempt to minimise the dangers from dishonest *gowallahs* and conditions of sale;—on the whole it may be said that some 40 per cent. of all samples analysed from various sources were found to be adulterated. It is indeed largely owing to the advocacy of Rai Bahadur Chunilal Bose as Chairman of the Calcutta Municipality that legislation has been introduced in the recent Municipal Act to improve what was a shocking state of affairs. Further, a standard of purity for Indian milk supplies is suggested in detail for buffalo's milk which the public health worker will find interesting and of important practical value.

In dealing with Indian infant mortality, the author pleads for improved sanitary conditions in lying-in rooms and for the employment of skilled help during labour, whilst maternity and child-welfare schemes for Calcutta are outlined, one of which at least is now in being. The health of Bengali college students—a most important racial question—is fully dealt with. The drink and drug traffic is dealt with forcibly and from the point of view of the future of the temperance movement in India.

In the biographical sketches Dr. Bose deals with such well known pioneers as Sir Jagadis Bose, and Dr. Mahendra Lal Sircar, the founder of the Indian Science Association. Finally a series of popular lectures on scientific subjects is followed by a series of most important papers on social questions in Bengal. The author condemns wholeheartedly the imposition of enormous marriage dowries on the marriage of Bengali girls; he advocates raising of the general age at marriage, the greater extension of marriage between subsections of the same caste, and the curbing of extravagance in expenditure on marriages. Professional beggary in Calcutta and the Calcutta Suppression of Immoral Traffic Bill of 1923 are also social matters dealt with.

The book is full of interest, not only to the educated medical man of Indian nationality, but also to the European reader. It presents the mature views and opinions

of a brilliant and widely educated Indian savant and thinker, thoroughly familiar with the many and important questions with which he deals, free from prejudice, but filled with ambition for the betterment of the condition of the people. Its informative value is very great.

PUBLIC HEALTH LABORATORY WORK (CHEMISTRY).—By H. R. Kenwood, C.M.G., M.B., D.P.H., F.R.S., F.C.S. Eighth Edition. London: H. K. Lewis & Co., Ltd., 1925. Pp. xii plus 369. Price, 12s. 6d. net.

It is difficult to include all the subject-matter on public health chemistry within a small compass, as the scope of the subject is very big. The author is to be congratulated on having presented this very successfully in his treatise to students of public health chemistry in a very clear and simple manner. Within the narrow limit of 363 pages he has left few points untouched. We can safely recommend this as a text-book on public health chemistry to the student going up for the D. P. H. examination of the Calcutta or other Indian university.

Nearly the whole of public health chemistry has been dealt with in one handy volume. The fact that the book had to be edited for the eighth time in the course of five years since its publication in 1920 is a proof of its growing popularity among public health students and public health workers. The present edition is an improvement on the last one; although the number of pages is diminished, the subject-matter remains the same. The old edition has been fully revised. The chapter on soils has been omitted, and at the end "The British Admiralty Test and Physical Test for disinfectants" which is entirely a new subject has been inserted.

We wish that some mention had been made of the subject of hydrogen ion concentration which has of late found so wide an application in public health chemistry. This could have been very easily included in Chapter XVI on "Acidimetry and Alkalimetry." Part I, on water. The "scheme for the detection of poisons added to water" given on p. 128 might preferably have been included in the chapter on poisonous metals on p. 40. The subject of poisonous metals added to water, e.g., barium, oxalic acid, mercury, potassium cyanide and strychnine, is more a medico-legal or forensic subject than akin to public health chemistry. A very short note on softening processes would not have been out of place in the chapter on hardness of water.

In connection with estimation of fat in milk one is disappointed not to find any mention of Gottlieb Rose's method which is the only method applicable to sour milk, and also of Leffmann-Beam's original process.

Diagrams illustrating Kjeldahl's process for estimation of nitrogen and Polenske's modification of Reichert-Meissl's process would have been very much welcomed by the student in India, also the description of the *Lancet* baryta-acetone method, which seems to be the standard method for the chemical analysis of phenolic disinfectants, would have been much appreciated by them.

With the above exceptions which are of course of only minor importance, the book practically satisfies the needs of public health students as well as of the public health worker.

B. B. K.

THE PATHOLOGY OF TUMOURS.—By E. H. Kettle, M.D., B.S. (Lond.). Second Edition. London: H. K. Lewis & Co., 1925. Pp. viii plus 284, with 159 illustrations. Price, 12s. 6d. net.

The second edition of this excellent manual is a welcome appearance.

The first section, which is concerned with the general biology of tumours, contains new material, particularly in that portion of it which deals with the experimental study of cancer.

The section on the endotheliomata presents the situation with regard to these tumours in a well considered manner.

It should help those who consult it to make fewer diagnoses of endothelioma, for, as stated on p. 169, "there has been far too great a tendency to name any unrecognised or anomalous tumour an endothelioma."

The controversy concerning the hypernephromata is outlined in some detail; that concerning the melanomata is brief and non-committal. Part III gives a concise description of the occurrence of tumours in special regions of the body.

The book is well produced and illustrated, there being many new figures, while "most of the original photographs of naked eye specimens have been replaced by drawings."

It is a worthy addition to the library of laboratory workers and teachers as well as students.

HANDBOOK OF GYNÆCOLOGY.—By Bethel Solomons, B.A., M.D. Second Edition. London: Baillière, Tindall & Cox, 1925. Pp. xlv plus 303, with 217 figs. and 2 coloured plates. Price, 12s. net.

We are glad to welcome the second edition of Dr. Bethel Solomons' "*Handbook of Gynæcology*."

The first edition was published in 1919 for the express purpose of providing a small, concise handbook for the medical student, and it has filled a long-felt want, for many of the text-books on gynæcology are now extremely bulky. In the second edition of Dr. Solomons' little book, about 50 pages of subject-matter have been added, also two coloured plates, and several extra drawings. The author has considerably lengthened the chapter on sterility, and special mention is made of a modification of Rubin's method of demonstrating the patency of the Fallopian tubes, which is as excellent as it is simple.

The notes on endometritis, erosion, dysmenorrhœa, and secondary amenorrhœa have also been greatly added to, and some mention is made of endocrine therapy in the last-named condition.

The last chapter in the book is an excellent contribution by Dr. Walter Stevenson on the use of x-rays and radium in gynæcology, and is a very welcome addition.

We can recommend this little book to the medical student, when beginning the study of gynæcology.

DISEASES OF THE EYE. A MANUAL FOR PRACTITIONERS.—By Lieutenant-Colonel H. Kirkpatrick, I.M.S. (retd.). Calcutta: Butterworth & Co., 1925. Pp. 132, with 28 half-tone illustrations. Price, Rs. 6-8 net.

This small book from the well-known pen of Colonel Kirkpatrick is one which will fill a gap between the teaching of the ordinary text-book and the actual facts of practice as found in India. It is described as an attempt to help practitioners in remote parts to render serviceable first-aid in eye cases, but in reality its detailed clinical differentiation of the common eye conditions and suggestions for treatment will be found useful by those with considerable experience. It is a purely clinical handbook and the ordinary detailed anatomy and pathology of the text-books is largely omitted, as well as all description of the rarer diseases not likely to be met with, and methods of examination such as tonometry not available to the ordinary practitioner. On the other hand the only ophthalmoscope described is the electrical self-lit one now available in cheap forms, (and no one who has experience with it will ever use any other), and the same touch of modern thought and practice extends through the whole book.

The first 22 pages of the book are devoted to the diseases of the lids and conjunctiva, considerable stress being laid on the differentiation between trachoma and the many conditions frequently mistaken for it, and their treatment being well given; 17 pages are given to the diseases of the cornea and lachrymal passages, non-ulcerative keratitis is well described, and the conditions resembling trachoma pannus but due to other irritations are clearly indicated.

In dealing with ulcerative conditions associated with infections of the conjunctiva, the open treatment and use of the author's magnesium sulphate lotion is advised. Diseases of the iris and ciliary body are discussed very briefly in 7 pages. In these first three sections the rôle of leprosy in attacking the eye is well pointed out.

Glaucoma is also treated very briefly, but the differential diagnosis of its acute and chronic forms is well and simply explained, and this section should be of great service to any practitioner when confronted with a puzzling case.

Eleven pages are devoted to cataract, the ordinary types and their causes being briefly described, while the questions of diagnosis, maturity, and the treatment of traumatic cases are discussed in some detail.

Disturbances of the motility of the ocular muscles are described in 9 pages, and this is probably the poorest part of the book, as it is impossible to do justice to this complicated subject in so short a space.

Examination of the fundus is described in 12 pages; this section is very good, as is also the description of how to use the ophthalmoscope. The account of the commoner morbid conditions seen with it is very simple and clear, and stress is laid on the recognition of retinal arterio-sclerosis which is of so much importance.

Eye strain, and the correction of errors of refraction occupy 9 pages, the 'fogging' method being described in some detail, but it is strange to find in the short description of retinoscopy that the necessity for a mydriatic when using this method is not mentioned.

Fifteen pages are devoted to operations on the eye. This section is well written, only the most usual and satisfactory operations being described, and the descriptions are very clear and adequate.

The last few pages are devoted to a number of useful prescriptions for various conditions.

The general get-up of the book is good and the illustrations are clear and useful.

In conclusion we may say that we know of no better elementary text-book for use in Indian medical schools, if it be combined with systematic oral teaching in elementary anatomy and pathology, and we can recommend it to all general practitioners as a valuable addition to their libraries, even if they already possess one of the larger systematic text-books.

Correspondence.

WANTED, SCORPIONS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I should feel much obliged if any of your readers can recommend to me any method of catching scorpions, or of attracting them in large numbers by artificial means. I desire to extract oil from them, and accordingly require scorpions in thousands.—Yours, etc.,

H. B. TEJUMAL,
Medical Practitioner.

CHIPRI QUARTERS, NEW SUKKUR, SIND.

7th November 1925.

[Note.—We have no doubt that if suitable financial inducement were offered, scorpions could be had in the requisite thousands. At least we recollect one enterprising snake-catcher who went in for breeding cobras when monetary rewards were offered for a supply of these snakes for venom-collecting purposes. Possibly however some of our readers may know sufficient of the domestic habits of the scorpion to give Dr. Tejumal the required information.—EDITOR, I.M.G.]

THE DANGERS OF DUSTING POWDERS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In the correspondence section of your issue for July, 1925, a letter appears from Mr. S. D. Narain, under the title "A case for Diagnosis."

Mr. Narain has unfortunately omitted to tell your readers what the dusting powder he was using in this case consisted of. If it was the common "B. & I." (boracic acid and iodoform) powder, then I think that the solution is perfectly simple and the diagnosis iodoform poisoning. The conditions in a post-burn ulcer are more favourable for the rapid absorption of iodoform than in a non-burn ulcer, for obvious reasons, and one must always bear this in mind, apart from the question of personal susceptibility, idiosyncrasy, etc.

I consider that in place of treatment with digitalis and strychnine in the case, sedative measures should have been employed together with direct antidotes, such as intravenous injection of one pint of 2 per cent sodium bicarbonate solution, repeated if necessary. I remember a similar case in my own experience which occurred at the Remount Depot, Mona in 1909, where similar symptoms set in owing to the excessive enthusiasm of the out-patients' departmental dresser. Under the above treatment the patient made a complete recovery in 48 hours.

There is no question of uræmia here, especially as Mr. Narain failed to detect any albumin in the urine.—Yours, etc.,

B. J. BOUCHÉ,
Assistant Surgeon, I.M.D.

JUTOGH, SIMLA HILLS,
16th August 1925.

GLYCOSURIA IN LEPROSY.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Since 1918 I have observed that in almost all cases of leprosy, even before the disease manifests itself either as the nodular or the nervous variety, the urine is able to reduce Fehling's solution, and shews the characteristic glycosuric reaction, although not as strongly as is observed in cases of diabetes.

The reaction continues during the course of the disease. Have any of your readers had any similar experience; and if so, is there any relationship between leprosy and glycosuria? I have searched many text-books, but have not been able to find any mention of glycosuria in leprosy.—Yours, etc.,

P. S. SRINIVASAN, L.M.P.

CONJEEVARAM, S. INDIA,
4th November 1925.

[Note.—We have shewn the above to Dr. Muir, Leprosy Research Worker at the Calcutta School of Tropical Medicine, who remarks that frequent examinations of the urine have been carried out at the Gobra Leper Asylum, Calcutta, but glycosuria has not been found to be a frequent affection in leprosy cases.—EDITOR, I.M.G.]

"PYREXIA OF UNCERTAIN ORIGIN."

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I have recently come across two similar cases of pyrexia, and would like to invite opinion as to the correct diagnosis in these cases.

The patient gets a sudden chill, followed by fever rising to 103° F., which then drops to normal, with sweating. The febrile period occupies about eight hours. This intermittent fever lasts for about 4 days, but the chills become less severe, and the temperature now becomes remittent, with no chill and no sweating. The remittent fever is followed by intermittent lysis, the morning temperature becoming sub-normal.

The course of the fever occupies 14 days, and the patient's chief complaint is of excessive pain and aching all over the body, especially in the abdomen, and of headache. The tongue is clean or only very slightly coated. The patient is constipated to begin with, but an enema acts well. The pulse rate never exceeds 90 per minute. In one of the cases there was slight bronchitis, in the other some pharyngitis. The muscles of the body are tender to pressure all over.

The first of these cases—a boy of 19—was taken to be malaria, then typhoid fever, then appendicitis, etc. Quinine in full doses had no effect upon the temperature and increased the pains. I was consulted on the 6th day of illness and gave urotropine, grs. 30 daily together with a mixture containing a drachm of ammoniated tincture of valerian, 10 minims of tincture of belladonna and grs. 15 of sodium bicarbonate. The patient did very well on this line of treatment, although morphia, administered to relieve the pain, had only a temporary effect.

The second case was that of a Brahmin female patient, aged 25. I was consulted on the 4th day of illness. The pain increased during the febrile attacks, but persisted during the apyrexial periods. The same treatment seemed successful in her case also.—Yours, etc.,

K. M. SHENAI, L.M. & S.

CAR STREET, MANGALORE,
2nd December 1925.

BACK VOLUMES OF THE "INDIAN MEDICAL GAZETTE."

MAJOR H. STOTT, I.M.S., Dean of the Faculty of Medicine, Lucknow University, King George's Medical College, Lucknow, has appealed to us to ask whether any of our readers can supply him on payment with volumes of the *Indian Medical Gazette* for the years 1865 to 1880, 1885, 1886 and 1887, which are wanted for the library of the University. The publishers of the *Gazette* have no copies of these volumes in hand, but possibly some of our readers may be able to supply Major Stott with them.—Editor, *I.M.G.*

THE WILLIAM GIBSON RESEARCH SCHOLARSHIP FOR MEDICAL WOMEN, ROYAL SOCIETY OF MEDICINE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Miss Maud Margaret Gibson has placed in the hands of the Royal Society of Medicine a sum of money sufficient to provide a Scholarship of the yearly value of £292, in memory of her father, the late Mr. William Gibson, of Melbourne, Australia. The Scholarship is awarded from time to time by the Society to qualified medical women who are subjects of the British Empire; and is tenable for a period of two years, but may in special circumstances be extended to a third year. The next award will be made in June, 1925.

In choosing a Scholar, the Society will be guided in its choice "either by research work already done by her, or by research work which she contemplates. The scholar shall be free to travel at her own will for the purpose of the research she has undertaken."

There is no competitive examination, nor need a thesis or other work for publication or otherwise, be submitted. The Society has power at any time to terminate the grant if it has reason to be dissatisfied with the work or conduct of the Scholar.

Applications should be accompanied by a statement of professional training, degrees or diplomas, and of appointments, together with a schedule of the proposed research. Applications must be accompanied by testimonials, one as to academic or professional status, and one as to general character. Envelopes containing applications, etc., should be marked on the top left-hand corner "William Gibson Research Scholarship" and should be addressed to Mr. G. R. Edwards, Secretary, Royal Society of Medicine, 1, Wimpole Street, London, W.1., and be received not later than Tuesday, June 1st, 1926.—Yours, etc.,

G. R. EDWARDS,

Secretary, Royal Society of Medicine.

1, WIMPOLE STREET,
LONDON, W.1.,
(Received: 11th January 1926.)

Service Notes.

APPOINTMENTS AND TRANSFERS.

In supersession of previous orders, the services of Lieutenant-Colonel W. F. Harvey, C.I.E., I.M.S., Director, Central Research Institute, Kasauli, are placed at the disposal of the Director-General, Indian Medical Service, with effect from the 4th June 1925, and he is granted, preparatory to retirement, leave on average pay for 8 months combined with leave on half average pay for 20 months, with effect from the same date.

Lieutenant-Colonel S. R. Christophers, C.I.E., I.M.S., is confirmed as Director, Central Research Institute, Kasauli, with effect from the 24th June 1925.

Lieutenant-Colonel W. G. Hamilton, I.M.S., is confirmed as Inspector-General of Prisons, Bengal, with effect from the 19th October 1925, *vice* Lieutenant-Colonel F. S. C. Thompson, O.B.E., I.M.S., retired.

The services of Major J. B. Hanafin, C.I.E., F.R.C.S.I., I.M.S., Officiating Director of Public Health, Assam, are placed temporarily at the disposal of the Government of Bombay with effect from the date on which he is relieved of his present duties.

Major N. S. Simpson, I.M.S., Superintendent of the Presidency Jail, is appointed to act as Inspector-General of Prisons, Bengal, during the absence, on leave, of Lieutenant-Colonel W. G. Hamilton, I.M.S., or until further orders.

Captain G. B. Hanna, I.M.S., Superintendent of the Dacca Central Jail, is appointed to act as Superintendent of the Presidency Jail, *vice* Major N. S. Simpson, I.M.S., appointed to act as Inspector-General of Prisons, Bengal, or until further orders.

Captain B. H. Singh, M.C., I.M.S., officiating Civil Surgeon, Midnapore, is appointed to act as Resident Medical Officer, Medical College Hospitals, Calcutta, *vice* Major N. C. Kapur, I.M.S., granted leave.

LEAVE.

Lieutenant-Colonel W. G. Hamilton, I.M.S., officiating Inspector-General of Prisons, Bengal, is allowed leave for seven months and eight days on average pay, with effect from the 13th December 1925, or any subsequent date on which he may avail himself of it.

Major N. C. Kapur, I.M.S., Resident Medical Officer, Medical College Hospitals, Calcutta, is allowed combined leave for one year, with effect from the 1st January 1926, or from any subsequent date on which he may avail himself of the leave.

PROMOTIONS.

The undermentioned Majors (now Lieutenant-Colonels) Indian Medical Service, are granted the acting rank of Lieutenant-Colonel whilst employed with the Mesopotamian Expeditionary Force:—

(1) G. Browne, D.S.O., M.D., from 9th August 1914 to 15th January 1917.

(2) A. B. Fry, C.I.E., D.S.O., M.D., from 1st December 1916 to 27th January 1919.

(3) L. Reynolds, M.B., from 22nd December 1916 to 12th October 1917.

(4) W. R. Battye, D.S.O., M.B., F.R.C.S., from 26th June 1917 to 27th January 1918.

Subject to His Majesty's approval, the promotion of Major S. Gordon, M.C., M.B., I.M.S., to the rank of Major is post-dated from 27th to 29th July 1924.

RETIREMENT.

The King has approved the retirement from service of Lieutenant-Colonel F. S. C. Thompson, O.B.E., M.B., I.M.S., with effect from the 19th October 1925.

RELINQUISHMENT OF RANK.

Captain (Actg. Major) (now Major) J. G. B. Shand, I.M.S., relinquishes the acting rank of Major on ceasing to be employed with a Casualty Clearing Station, 7th April 1919.

NOTES.

'ARTIFICIAL SUNLIGHT.'

At present heliotherapy—the treatment of disease by exposure of the body to intense sunlight—is undergoing a boom in the lay press. We are treated to pictures—more or less badly reproduced—of rows of patients in delightful open air hospitals in the Alps, reverting to a state of nature, and bathed in radiant heat. In a recent and very clever short story in *Punch*, a tired millionaire is advised to undergo such treatment in the most deserted spot which he can find in the Pyrenees. He does so, and his nostalgia disappears from him “as doth a garment.” His discovery, however, that the fashionable mother and daughter from whom he has expressly fled, and who are the *bête noire* of his existence, are also undergoing the same treatment on the other side of the same hill, causes a severe relapse of his former condition, and he commits suicide!

It is well that the public should take an intelligent interest in the doings of the medical profession, but sensationalism is to be profoundly deplored, and it behoves all concerned to maintain a rational point of view. Heliotherapy, and actinotherapy—the term used to describe all forms of treatment by artificial ultra-violet radiation, are still in their infancy. Dr. Rollier, who is generally regarded as the greatest living authority on treatment by natural sunlight, states “Sun- and ultra-violet rays bear much the same relation to one another as crude drugs to their synthetically prepared chemical substitutes.”

The use of sunlight is crude and is beset with many difficulties; that of artificial ultra-violet rays can be standardised, controlled, and made available at any time. The action of the rays has been shewn by Browning and Russ to vary from those in the near ultra-violet region of the spectrum, which have great powers of penetrating the skin, but little germicidal value; to those in the far ultra-violet region, which are strongly germicidal, but have little penetrating value.

In their recent bulletin on “Artificial Sunlight,” Messrs. Watson & Sons (Electro-Medical), Ltd., Sunic House, 43, Parker Street, Kingsway, London, W. C. 2. deal with the apparatus used for all forms of ultra-violet or photo-therapy. The brochure illustrates no less than 17 distinct models. Among lamps for general treatment the mercury vapour lamp is perhaps that in most general use; and here their artificial Mountain Sun atmospheric mercury vapour lamp is of interest. The radiations from the tungsten arc, however, are remarkably uniform and have advantages over the mercury vapour lamp both with regard to uniformity and intensity throughout the whole therapeutic range of the spectrum, and the best model for the general practitioner, who is bent on securing the widest possible scope of utility with a single installation, is probably the lamp with carbons cored with molybdeno-tungsten powder, shewn on p. 17 of the brochure.

For local applications the tungsten “Hall lamp” and “Premier lamp” are illustrated, whilst there are also fittings enabling the “Artificial Mountain Sun mercury vapour lamp” to be used for this purpose.

Messrs. Watson's pamphlet will undoubtedly interest all medical men who have taken up the study of the subject. They express it as their decided view that, whilst research work must be left to those competent to carry it out, and whilst sensationalism in the lay press and elsewhere should be steadily combated, it is their duty as manufacturers of experience and standing to see to it that their apparatus shall embody suitability and reliability, and shall incorporate the latest results.

CONTREXEVILLE MINERAL WATER.

The spa treatment of gout, rheumatism, and many different types of synovitis and arthritis by mineral

waters is a sensible and rational proceeding,—one far better in procedure and often far better in results than the attempt to use injections of potent drugs which may do harm rather than good. Among such spa treatments in Europe the reputation of the Contrexeville spring stands very high, the patient not being drugged, but instructed with regard to his diet and habits, and made to contract a new habit, that of drinking the water daily. The English agents for the Contrexeville-Pavilion Mineral Water are Messrs. L. Guggenheim, 36, Mark Lane, London, E. C. 3; and the Indian agents; Messrs. Kemp & Co., Charni Road, Queen's Road, Bombay.

“PHARMASOLS.”

THE use of colloidal solutions in medicine is daily increasing and it is important for the practitioner to have such solutions of a truly colloidal, and not merely suspensory character, and of reliability. With regard to both requirements the “Pharmasols” of the Anglo-French Drug Co. (Eastern), Yusuf Building, Church Gate Street, Bombay, offer attractive products. Amongst the various “Pharmasols” listed are “Pharmasol” antimony for use as a substitute for other antimony preparations in leishmaniasis; “Pharmasol” argentum, for use in chronic inflammations of mucous membranes; “Pharmasol” arsenicum for intramuscular injection of arsenic in anæmias and skin diseases; “Pharmasol” bismuthum for oral use as a very fine preparation in dyspepsia and gastritis; “Pharmasol” collo-calcium in tuberculosis; “Pharmasol” iodum for use wherever iodine is indicated; and, of special interest, “Pharmasol” chaalmoogra oil, either as a 1 per cent. preparation for oral use to provide the leper patient with a palatable and easily taken preparation for oral use in place of crude and nauseating chaalmoogra oil, or in sterile 0.1 per cent. solution for subcutaneous and intravenous administration.

SRINIVASAN'S MEDICAL DIARY FOR 1926.

THIS is the second year in which we have had the pleasure of receiving this useful little handbook for review. It is published by V. Srinivasan, 44, Rattan Bazaar Road, Madras, at the price of Re. 1 and contains information of special value to medical men in India. The usual information as to pharmacopœial preparations, posology, weights and measures, etc., is followed by a list of new and non-official remedies with their synonyms. A list of drugs used in S. India gives their corresponding names in four vernaculars. Obstetric, ophthalmological and other information and tables are followed by medico-legal information under the Madras laws. The calendar itself gives all the (numerous) Indian festivals and holidays in S. India, and one full blank page for every day of the year. Finally the calendar is cheap, of handy size and well bound. We regret that it was received (in December) too late for notice in our issue for last month, but would like to bring its annual existence to the notice of our readers.

MESSRS. G. W. CARNRICK CO.'S NEW PRICE LIST.

WE have received from Messrs. G. W. Carnrick Co., of New York, a copy of their new price list for September 1925; which shews mainly reductions in the price of preparations of desiccated single glands. Messrs. G. W. Carnrick Co.'s glandular preparations are well known, and cover a very wide range of endocrine products, both from mixed and from single glands. “Hormotone,” “Hormotone without post-pituitary,” and “Secretogen” are perhaps the best known products of this firm. In all cases the dosage given is in terms of the desiccated gland product, as is required in the U. S. A. and British Pharmacopœias. The Indian agents are Messrs. Muller and Phipps (India), Ltd.

ALVARENGA PRIZE OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA.

THE College of Physicians of Philadelphia announces that the next award of the Alvarenga Prize, being the income for one year of the bequest of the late Senor Alvarenga, and amounting to about three hundred dollars, will be made on July 14, 1926, provided that an essay deemed by the Committee of Award to be worthy of the prize shall have been offered.

Essays intended for competition may be upon any subject in medicine, but cannot have been published. The essay should represent an addition to the knowledge and understanding of the subject, based either upon original or literary research. They must be typewritten, and in English acceptable for publication without necessity for editing by the Committee. Any illustrations should be appropriate and correctly annotated with the text. Essays must be received by the Secretary of the College on or before May 1, 1926.

Each essay must be sent without signature, but must be plainly marked with a motto and be accompanied by a sealed envelope having on its outside the motto of the paper and within the name and address of the author.

It is a condition of competition that the successful essay or a copy of it shall remain in possession of the College; other essays will be returned upon application within three months after the award.

The Alvarenga Prize for 1925 has been awarded to Dr. Raphael Isaacs, Boston, Massachusetts for his essay entitled:—"On the nature of the action of Roentgen Rays on living tissue."

JOHN H. GIRVIN, *Secretary*,
19, South 22nd Street, Philadelphia, Pa, U. S. A.

MESSRS. NEWTON AND WRIGHT'S RADIATION AND DIATHERMY APPARATUS.

We have received from Messrs. Newton and Wright, 471 1/3, Hornsey Road, London, N.19, brochures dealing with apparatus which they have recently designed or improved from older models for ultra-violet therapy and diathermy. Their "K. B. B. Atmospheric Quartz Burner" for ultra-violet therapy is of special interest in that the quartz envelope is not exhausted, but works under atmospheric pressure. Vacuum seals can therefore be dispensed with; the burner is of robust construction, and in a recent test one of them ran for 9,000 hours before it failed. Of mercury vapour arcs for full body treatment, a complete model of sun type, mounted on a floor stand with fittings is listed at £45, also a cheaper one for suspension from the ceiling at £20-10-0. For the treatment of restricted areas their "K. B. B. type A, medical lamp" with water cooled housing and quartz window, fitted for wall insertion, costs £55-7-0. A "Universal table," 1925 model, has many features of interest. In their "Holway" diathermy apparatus, suitable either for hospital practice or for surgical purposes, special attention has been paid to the spark-gap. This consists of an aluminium chamber extensively ribbed on the outside, so that even with a large current it does not become unduly hot. This chamber is provided with an inlet and an outlet tap for gas dielectric, and can also be arranged for use with ether in cases where no gas supply is available. The actual gap comprises a large copper disc, heavily silvered, bridging over the space between a pair of heavy copper electrodes, likewise silvered, so that the gap is in duplicate, an arrangement which conduces to a steady current, while affording means of convenient and delicate adjustment. The electrodes, which are mounted on thick mica diaphragms, are provided with radiation fins for cooling.

Other interesting equipment described is a new "Holway" Potter Buckley diaphragm, which can be used in the upright position in conjunction with a suitable screening stand, or used inverted over the table with

the tube below the table; also their "Instanta Flexible" intensifying screens.

HORLICK'S MALTED MILK CO.'S 1926 CALENDAR.

We have received from Messrs. D. J. Keymer and Co. (Horlick's Malted Milk Co.), a copy of their most sumptuously coloured calendar for 1926, which we think will especially appeal to medical men in India, since its subject is chess in an Indian zenana. In describing the calendar, Messrs. Keymer writes:—

"Three of the chess verses of Khayyam are illustrated in the setting of the game and the general surroundings, and are printed at the foot in the Naskhi character. One, transliterated in Roman as well, is the origin of Fitzgerald's famous paraphrase:—'Tis all a Chequer board of Nights and Days."

This will be of interest to many readers who have never seen Omar in the original dress. All who read Urdu can follow the easy Persian.

A special and interesting feature is the exact reproduction on the zenana panels of two pages of the beautiful *nim-shikasta* MSS. on which Fitzgerald's *Rubaiyat* is mainly based.

The calendar will, we think, be best appreciated in Turkey, Persia, Iraq, all Urdu-speaking or Urdu-reading Northern India, and in States or other circles of the South where Persian or Urdu is read.

It may at first sight appear that, apart from the heading, there is very little matter in the calendar as propaganda for Horlick's, but this has been left to suggestion. Horlick's Malted Milk is being quietly prepared by a female attendant on the left just under a verse expressing a craving for wine—Omar's weakness, if we take him literally.

A verse ascribes the lady player's victory to a complexion out-rivalling the eglantine or Chinese fairest porcelain idols, and as she is evidently a votary of Horlick's, the readers will give H.M.M. the credit for her good looks. Nor will they fail to notice that two glasses of Horlick's are being prepared, and conclude from the virility and physical fitness of the Prince that, notwithstanding his Khayyamesque pose and surroundings, he has long since made up his mind about his favourite beverage."

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Annual Subscription to "*The Indian Medical Gazette*," Rs. 16 including postage, in India. Rs. 18 including postage, abroad.

Papers and articles forwarded for publication are understood to be offered to the *Indian Medical Gazette* alone, and any breach of this rule will be followed by non-publication.

The Editors of the *Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

Original Articles.

DIFFERENTIAL DIAGNOSIS IN THE TROPICS.*

By A. H. PROCTOR, M.B., B.S., M.D., M.S.,

LIEUT.-COLONEL, I.M.S.,

Civil Surgeon, Darjeeling.

RECENTLY one of my colleagues made a remark that diagnosis in this country was very different to what it is at Home. What in England was a perfectly straightforward case of say appendicitis, had in Calcutta all kinds of possibilities.

I propose therefore to set out some of my own experiences in the hope that they may be of use to practitioners and help them to avoid mistakes which I and others have made.

The subject is a little difficult to arrange, and after consideration I have decided to take up the ordinary tropical diseases and describe cases in which they have simulated other diseases. An alternative method would have been to take up certain symptoms and describe the diseases likely to give rise to them. This is the method usually followed in books on differential diagnosis such as French's invaluable "Index." In this case I feel it would not emphasise the object I have in view, namely, the many protean manifestations of some common tropical diseases.

To begin with we must concede first place to *malaria*. This table gives the symptoms originally complained of in 426 cases admitted to hospital.

Usual symptoms	..	..	362
Anæmia	..	..	4
Vomiting	..	..	7
Gastric pain	..	..	6
Colic	..	..	2
Hæmatemesis	..	..	3
Diarrhœa and dysentery	..	..	11
Cholera	..	..	1
Difficulty of micturition	..	..	3
Respiratory conditions	..	..	12
Collapse	..	..	3
Typhoid state	..	..	1
Cerebral and nervous symptoms	..	..	7
Jaundice	..	..	4
			426

I want you to bear in mind that the diagnosis of malaria was only arrived at after a stay in hospital, and that, originally, all that these cases complained of were the symptoms

* Being a clinical post-graduate lecture, delivered at the Calcutta School of Tropical Medicine.

recorded. Of course under the head "vomiting" we have only included cases where vomiting was the sole symptom complained of. It is scarcely necessary to state that vomiting accompanied by fever, ague, etc., is one of the commonest symptoms. Such cases have been included in the 362 usual signs and symptoms.

Figures are dull and I do not propose to discuss percentages or anything of that sort. The table is only put forward to illustrate the numerous disguises under which malaria presents itself in your consulting room. I was surprised myself to see how seldom vomiting appears in the table. My own experience is that patients frequently come to see you and their first reply to your question is "I can't keep anything in my stomach." As often as not when questioned they will say they have no fever. Especially with mothers who bring their children. Nowadays in the case of children who are vomiting one immediately examines their urine for acetone and diacetic acid, finds them present and promptly makes a diagnosis of acidosis. Blessed word! It has got the doctor out of many a tight corner with a persistent mother. But it won't save your reputation with her if after a course of alkalis someone else examines the blood and finds malarial parasites. So I advise you in every case of vomiting to have a blood film taken. Even if you cannot get a blood film never fail to examine the spleen, it is nearly always palpable.

Here is the type of case described as gastric:—

Complains that for the last month he has had neuralgic pains from the back of the neck to the shoulder-blade and then to the stomach. Pain settled in the pit of the stomach, felt like something pulling him crossways, intermittent, not severe enough to double him up. Has never vomited blood, no tarry stools, no relation with food—(note that point),—but could not retain anything for more than 20 minutes, icteric tinge to conjunctiva, stools always bilious and urine high-coloured. Mustard plaster relieves his pain. Temperature 97.6°, pulse 96, no anæmia; tenderness on deep pressure 1" below the xiphisternum. No mass felt. Note how up to this point the recorder's mind has run on duodenal or gastric ulcer; none of his enquiries suggest a suspicion of malaria. He then continues, "Spleen slightly enlarged, liver normal, not tender." Three days later malignant tertian rings and crescents are found, the patient is put on quinine and discharged cured, but from the date of admission to discharge he never has a rise of temperature. Had it not been for his blood examination he might still have been on bismuth and gastric sedatives. He had been on them for the best part of a month before admission, and was probably described as a gastric type of influenza. The notes do not

record his diagnosis prior to admission to hospital.

Numerous cases of this type come under observation and I can only conclude that the pain is splenic in origin. We know little at present as to the cause of pain in the abdominal viscera, but it is easy to suppose that with an enlarged and engorged spleen, pain may well be referred to areas associated with the stomach. While on the subject of pain due to affections of the spleen, it occasionally happens that it is referred to the left shoulder; much as liver pain is referred to the right. I have seen this happen in a case of kala-azar, a disease we do not usually associate with pain.

Of colic two cases are recorded. These were intestinal colic associated with fever. The most striking case however was one of renal colic. As Medical Officer of the Officers' Hospital in Mesopotamia I was sent for to see a case of renal colic. The attack was typical in every way of renal calculus. It followed on a hard game at tennis and was accompanied by a transient hæmaturia and moderate rise of temperature. Under the usual treatment the patient was better in the morning. The next evening he had another attack with the same result. When a third attack occurred at the same time the following evening we decided it was time to take a blood film. The result was positive and on quinine his renal colic disappeared and as far as I know never returned.

The result was dramatic in its sudden termination. The pathology I have no doubt was a blocking of the renal capillaries by parasites, and hæmorrhage, resulting as it usually does in marked renal colic, owing to the passage of clots.

Let us now turn to the cerebral and nervous types of malaria. My attention was first drawn to the possibilities of error many years ago in China. I have not the notes of the case with me now, but it so impressed itself on my memory that I can quote them fairly accurately.

He was a Punjabi recruit only recently arrived and was brought to hospital with a story that he had wakened up that morning paralysed in both legs. On examination he had no temperature but symptoms of a complete transverse myelitis. He said he was quite well the evening before. In hospital that evening he had a temperature and developed retention of urine and some extension of his paralysis. A consultation of the medical officers of the hospital carried us no nearer the solution, and as there was no malaria at that time among the troops we did not suspect it. A tertian periodicity in his temperature suggested an examination of his blood and malarial parasites were found. He made a perfect recovery on quinine. Apparently he

had contracted malaria in the Punjab before sailing and developed this unusual nervous type immediately on arrival. I can assure you I had considered the possibility of several nervous diseases, but malaria had not crossed my mind. So far as I remember I was in favour of an acute anterior poliomyelitis. We are all acquainted with the ordinary cerebral type of malaria, but it is as well to bear in mind that almost any abnormal nervous symptoms may be due to malaria, more especially if accompanied by fever, and that treatment is urgent if the patient is to be saved. Thus we may meet with coma, convulsions, apoplexy, aphasia, paraplegia and meningeal cases. Convulsions and meningeal types are particularly common in children.

Neuralgia, more especially supra-orbital neuralgia, is stated to be commonly associated with malaria, but in my experience it is a rare complication or sequela. I should hesitate to attribute even a supra-orbital neuralgia to malaria till I had exhausted all the more probable causes such as carious teeth, nasal sinus affections, ophthalmic affections, and syphilis.

The presence of loose stools and the passage of blood and mucus in the stools sometimes leads to an erroneous diagnosis when it is due to malaria, the blood being attributed to dysentery or to hæmorrhage in a case of typhoid. Perhaps the most difficult cases are the algid type, of which you will see one which is described as cholera and the others as collapse. These are not common, but when they are first seen mimic the collapse stage of cholera very closely and I have known them treated as cholera. An examination of the blood and stools usually clears up the point, but as one's attention is usually concentrated on giving hypertonic saline and not on laboratory examinations it is useful to remember that the intravenous injection in cases of cholera usually results in the passage of typical cholera stools and fresh vomiting. This is not the case in malaria, nor does the case improve to the same extent with the injection.

Of jaundice it may be said that a mild icteric tinge is an almost universal accompaniment of malaria, but that occasionally one sees cases of deep jaundice, of malarial origin. Jaundice in these cases is due to excessive destruction of blood cells and whether this is due to an increased fragility of the red cells due to prophylactic quinine or other causes, or whether a severe infection plus damage to the polygonal cells of the liver, I do not know. Certainly the jaundice does not always seem proportional to the severity of infection and therefore we may conclude that some secondary factor is included as well.

Finally the most likely cases to be overlooked are those of general debility and *malaise*. Frequently a patient consults you who does

not feel well but can tell you nothing definite. A week or two later he has a typical attack of malaria and the reason for his *malaise* becomes obvious. In these cases an examination of the blood when the patient is first seen often reveals malarial parasites. They are important cases to recognise because they are easily cured when diagnosed.

So far I have said little as to the actual differential diagnosis. The table I have shown only gives conditions that are due at times to malaria and have been labelled as other than malaria. If I were to attempt to describe all the conditions that I have seen labelled malaria I should practically cover every disease accompanied by fever, or an enlarged spleen. My object has been rather to describe those conditions due to malaria, liable on superficial examination to have a more obvious diagnosis made. How are we to avoid mistakes in atypical cases? First and foremost of course an examination of the blood. The finding of malarial parasites gives you a confidence and certainty in diagnosis and treatment that nothing else can. Unfortunately in this series of cases parasites were only found in 41 per cent. of the cases. This seems a low figure at first sight but I believe it must be about the average for hospital statistics. The unusual cases I have cited were diagnosed because parasites were found and it is chiefly in typical clinical cases that we have to record a failure to find the parasite. This is due to several causes but the commonest is undoubtedly the result of a dose or two of quinine before admission. What other guide have we then in doubtful cases? Colonel Calvert used to teach that the quinine test was more reliable than the microscope, and Rogers is more definite still. He states, "The longest period I have known a fever, showing malarial parasites in the blood, to last under efficient quinine treatment is six days. Even in this case marked benefit was obvious on the fifth day." He also states the average duration of fever for malignant tertian cases to be 2.1 days and of benign tertian infections 1.57 days. Only 8 per cent. of malignant tertian cases lasted more than four days. So that if quinine is properly administered a fever lasting more than four days is not malarial. Yet we frequently have cases admitted as malaria who have had fever treated for weeks with quinine without any result. I ask you to note Rogers' qualification, "under efficient quinine treatment." The important points in that are adequate dosage, a soluble quinine product, and a preliminary mercurial purge.

The only trap I know of in the quinine test is the terminal rise of dengue. Cases coming in on the 6th or 7th day with a history of several days' fever, chill and high temperature on the day of admission, may be given

quinine and are normal next day. In this case a very slow pulse in proportion to temperature is in favour of dengue, plus the acute back-ache and enlarged cervical glands. The remaining characteristic feature of malaria is the slight icteric tinge combined with anæmia, which gives a characteristic look to malarial cases in Europeans, and is particularly valuable in patients complaining of debility.

Let us now leave malaria and turn to its greatest rival in this part of the world, *kala-azar*.

Kala-azar 150 Cases. Primary Symptoms.

Fever and enlarged spleen	..	120
Do. and anæmia	..	7
Ascites	..	4
Genito-urinary	..	2
Diarrhoea and dysentery	..	5
Enlarged liver and jaundice	..	1
Cancrum oris	..	2
Joint pains	..	1
Nervous symptoms	..	2
Lung conditions	..	3
Vomiting	..	3

Total .. 150

In this table you see that most of the atypical conditions complained of are recognised complications of *kala-azar*, and it is chiefly with the differential diagnosis of the fever we are concerned.

By far the commonest mistake is to diagnose *kala-azar* as enteric fever. No less than 31 of the 150 cases had the initial fever diagnosed as enteric, many of them in hospital. Now that I am alive to the possibility, I am more suspicious, and in Calcutta I am inclined to regard continued fevers as *kala-azar* until Widal reactions and cultures prove that they are enteric. There are one or two points of value however in differentiating the two. Firstly, the spleen steadily enlarges with the duration of the fever in *kala-azar* and as a rule it reaches a larger size than it does in enteric. Secondly, the general condition of the patient is, as a rule, less toxic than the duration of the fever would lead you to expect. Thirdly, there is a progressive leucopenia, so that the proportion of white cells to red cells falls below 1 in 1,000. Fourthly, the double rise in 24 hours. We seem now however to be getting a much more acute type of *kala-azar* than formerly, and latterly I have found the less toxic condition of cases not such a safe guide. The leucopenia and double rise are the main points on which to rely. Jaundice is also frequent in these acute cases, and marked flatulent distension, so marked indeed that it masks both spleen and liver. I used to regard a hæmorrhage from the bowel as confirmatory of enteric but this is not so. It seems to be almost as common in *kala-azar*.

I recently diagnosed septic cholangitis in a case which ultimately proved to be kala-azar. The patient was an old gentleman suffering from diabetes who developed fever with chills and profuse sweats, fairly deep jaundice, marked distension of the bowels and an enlarged and tender liver. There was no marked leucopenia, his white cell count being 6,000 and his red cells 4,200,000. His spleen was not palpable till the 30th day of his fever. On the strength of an increasing leucopenia and a double rise on one occasion we punctured his liver and found Leishman-Donovan bodies. He responded rapidly to treatment with stibamine.

Shortly after, an almost similar case came in although his spleen was markedly enlarged. In this case a liver puncture was negative but he was given von Heyden "471" and his temperature fell shortly after, and on "471" the patient is improving steadily. I think that in "471" and urea stibamine we have a therapeutic test of considerable value. Dr. Napier informs me that he considers the therapeutic test takes too long to be of value and, because of the dangers associated with the administration of antimony, does not agree on this point. I agree with him if sodium antimony tartrate is used, but not in the case of the organic antimony compounds recently introduced.

I must admit that examination of the peripheral blood has failed me and I have little experience of blood cultures, though they would appear to be the easiest and simplest solution of the difficulty. I am chary of splenic punctures unless the spleen is enlarged to a considerable extent and in such cases it would seem hardly necessary. In children a general anæsthetic is essential to carry out a spleen puncture safely.

After enteric, considering the rarity of the disease, malignant endocarditis is the commonest disease to mistake for kala-azar. Of course the cardiac murmurs should put you on your guard, but often these cases give a history of long-standing heart disease and in such cases, in Calcutta, you regard the case as one of kala-azar arising in a case of chronic heart disease. The blood count is a help of course but often fails, as do blood cultures. The main safeguard however is to be aware of the possibility of the two diseases being mistaken for each other. The spleen of malignant endocarditis is usually tender and undergoes sudden painful enlargements due to embolism. The golden rule never to explain symptoms as arising from two diseases when they can be accounted for by one, will save many an error.

The tendency to hæmorrhage characteristic of kala-azar gives rise to errors, and I have had several cases of fever plus hæmoptysis due to

the Leishman-Donovan body. The natural inclination is to diagnose such cases as tuberculosis with slight physical signs, unless a very thorough examination is made.

The first case of kala-azar I had shown to me in a *mofussil* hospital proved to be a case of splenomedullary leukæmia. Of course an examination of the blood at once revealed the true nature of the disease. As cases frequently have pyrexia for prolonged periods the mistake was not an unnatural one in a hospital which, at that time, did not possess a microscope. Once again I would emphasise the necessity of using your microscope.

It has always seemed curious to me that in a country where pathological conditions of the spleen are common, we scarcely ever hear of splenomegaly due to conditions which prevail in Europe. I refer to splenic anæmia, acholuric jaundice and syphilitic disease of the spleen in infants, to say nothing of the rarer Gaucher's spleen and von Jaksh's disease.*

With regard to splenic anæmia and acholuric jaundice, splenectomy is the recognised treatment and is followed by good results. It is therefore important to recognise the condition. These conditions are not so very uncommon, as I saw during my last furlough two cases of acholuric jaundice and one of splenic anæmia in the neighbourhood where I was living, though the population of the area cannot have been more than 2,000.

The probability is I think that in this country these cases are attributed to more common causes of splenomegaly and are therefore overlooked. I myself have not seen any cases but it is only recently I have been on the look out for them.

It would seem improbable that a case of malaria should be diagnosed as kala-azar, but such a case was admitted last year who had had a course of injections for kala-azar until he was too weak to attend for more. He was very weak and emaciated on admission and had an enlarged spleen but no enlargement of the liver. Blood examination showed a benign tertian infection and he rapidly improved on quinine. There is such a condition as malarial cachexia and it is an unfortunate error to diagnose it as kala-azar.

Jaundice without fever is sometimes caused by kala-azar. A useful point in these cases is the fact that bile remains present in the stools, distinguishing it from obstructive jaundice. Sooner or later fever appears.

Let us now turn our attention to infections by *Entamæba histolytica*.

* But see the article by Capt. W. C. Spackman on Gaucher's type of splenomegaly in a Mahratta village. *Indian Med. Gaz.*, Feb. 1925, 69—Editor, I.M.G.

Amoebic infections of:—

LIVER.	CEREBRUM 1.
Usual symptoms 14	This was a cerebral abs-
Peritonitis .. 2	cess found on post-
Jaundice .. 1	mortem to be due to
Gall-stone colic 1	<i>Entamæba histolytica</i> .
Dyspepsia 2	
Lung affections 5	
Fever only .. 7	
Enteric fever .. 1	
TOTAL .. 33	

8 cases, or 24 per cent. required surgical interference.

Acute amoebic intestinal infections.

Usual symptoms	..	238
" " with fever	..	30
Diarrhoea and constipation	..	44
Difficulty of micturition	..	5
Choleraic	..	1
Appendicitis	..	5
Piles	..	3
Vomiting	..	3
Joint affections	..	3

Chronic amoebic intestinal infections.

Dyspepsia	..	5
Appendicitis	..	4
Colic	..	5
Piles	..	4
Anæmia	..	4
Rectal conditions	..	5

TOTAL .. 359

You will see quite a large number of cases came in complaining of alternating diarrhoea and constipation. This is very usual, so usual that I doubt if I should comment on it, except that patients often attribute the diarrhoea to the preceding constipation. Constipation is also frequently troublesome after an attack of dysentery. In all such cases the stools should be emulsified and carefully examined. It is not of much use to look at a stool, it must be broken up and emulsified thoroughly. Often both blood and mucus will then be found when they would have been missed in an ordinary stool. Major Hingston, I.M.S., demonstrated to me a most excellent way of obtaining samples of mucus when looking for the amoeba in acute and subacute cases of dysentery. He inserts a gum elastic Coudé catheter in the rectum, turns it round several times, withdraws it and then takes a specimen of the mucus contained in the eye of the catheter. In this way absolutely fresh specimens are obtained and the entamæba and other parasites shown in full activity. It saves waiting for a stool and ensures a fresh specimen.

Difficulty of micturition in the shape of stranguary is so urgent and trying that the patient forgets to mention his having dysentery.

It is usually associated with ulceration of the rectum. Appendicitis and dysentery are so frequently confused, and the need for accurate diagnosis so urgent, that I have learnt to regard a diagnosis of appendicitis as to say the least difficult. There is of course no reason why a dysenteric ulcer should not arise in the appendix and in such cases you would have a true inflammation of the appendix and it would require surgical treatment just as much as any other. Why do I say the need for accurate diagnosis is urgent? Well, appendicitis we all regard nowadays as an acute abdominal emergency requiring immediate operation, but if by mistake you submit a case of acute dysentery to operation you will find such cases have a very high mortality. They stand operation badly. The mistake will be avoided if a careful history is obtained, remembering that constipation is usual in appendicitis, that the onset is fairly sudden, and previous attacks the rule. McBurney's point is very definite and localised; it is not a vague ill-defined area in the iliac fossa. It is in fact no longer as a rule than the tip of your forefinger. Also remember Murphy's rule that the order in which symptoms appear in appendicitis is pain, nausea or vomiting, local sensitiveness, then temperature and leucocytosis. Any variation in this order should make you suspicious, and bear in mind that the pain of the first few hours is referred to the umbilicus. In dysentery careful enquiry will probably reveal some diarrhoea, an absence of nausea and an early elevation of temperature. Tenderness is not localised but fairly general over the cæcum and colon. While we are on the subject of appendicitis, once again a tropical disease, namely, dengue, results in an exception to the rule pain, nausea, local tenderness and fever. Appendicitis appears to be frequent in cases of dengue, in which case, of course, the temperature rises early. The association of dengue and appendicitis would seem worth investigating.

The appendix in its turn may be the cause of dysenteric symptoms. Thus an appendix abscess in the pelvis will cause frequent stools containing mucus, tenesmus and pain and it is by no means uncommon to see such cases regarded as dysentery until a mass appears above the pubis. Pelvic abscesses due to other causes produce similar symptoms. The ulcerative conditions of the rectum are frequently diagnosed as dysentery, amoebic or bacillary, and I would warn you against the tragic mistake of diagnosing carcinoma of the rectum as a chronic dysentery. Always make a rectal examination in a case of blood or mucus in the stools which fails to improve rapidly under treatment. Amoebic conditions improve so rapidly under emetine and stovarsol that there is no excuse for cases continuing for weeks, without a rectal examination,

but, in my own experience, I have known such a case treated as dysentery until secondary deposits in the liver revealed the correct diagnosis. At the opposite end of the scale I have known a case of amœbic ulceration of the rectum treated for two years as "piles." In both cases they had never had a rectal examination. No case should be diagnosed as chronic dysentery unless a careful examination of the stool has revealed the organisms known to cause dysentery. I have not diagnosed a case of dysentery as intestinal obstruction, but I must own up to having lost much valuable time in diagnosing an acute intussusception in an infant as a bacillary dysentery. The large quantity of blood and mucus passed mimicked a bacillary dysentery stool very accurately, and the usual tumour was difficult to feel and then only resembled the thickened colon so common in dysentery. Eight hours later the diagnosis was clear. Perhaps I was influenced by the fact that on a previous occasion on which I saw a laparotomy done for intussusception, the case proved to be one of dysentery.

When we come to amœbic infections elsewhere than in the intestine, the commonest organ involved is the liver. Of the 33 cases you will see that more than half presented unusual features. The peritonitis cases were ruptured liver abscesses, the lung affections basal pneumonias or ruptured abscesses. Fever alone is not uncommon and it was Rogers who first drew attention to the pre-suppurative stage of hepatitis. The effect of emetine is probably the most useful test for it, as it usually markedly influences the temperature in three days. It is, however, useful to remember that quite large liver abscesses may remain latent and produce no obvious symptoms till they rupture into the lung or abdominal cavity.

If they rupture into the lung they are liable, if small, to be mistaken for lobar pneumonia. Once again a microscopic examination of the sputum furnishes the diagnosis and results in a dramatic recovery under treatment.

If they rupture into the abdomen the usual diagnosis is a ruptured gastric or duodenal ulcer. These are most often abscesses of the left lobe which at all times are difficult to identify.

Undoubtedly the greatest aid to the diagnosis of hepatitis and liver abscess is an x-ray screen examination. The radiologist can in these cases almost invariably give you a positive or negative diagnosis.

One point that suggests an amœbic infection is the peculiar earthy complexion such cases get and the doughy inelastic skin.

While the liver and intestines are the commonest sites of amœbic infections, other tissues of the body are liable to infection. Ulcers of the skin have been described and

abscesses of deep muscles are occasionally met with.

By far the most tragic case in the Calcutta General Hospital records was a cerebral abscess which on post-mortem examination proved to be a pure amœbic abscess. When one thinks what emetine could have done for such a case one cannot help feeling guilty at not attaching importance to a history of dysentery some time before. The *Entamoeba gingivalis* is found in the gums. Major Knowles, I believe, considers it harmless, but I have seen a spongy hæmorrhagic condition of the gums clear up wonderfully on emetine administration. A variety of conditions of the gums are common in India, not all of them ordinary pyorrhœa. If spirochætes are present, as they frequently are, a course of arsenic will frequently clear up the whole condition.

Cancrum oris, we frequently see in kala-azar, but I do not think it is generally realised how easily it can be stopped in the initial stages. An inspection of the mouth should be part of the routine daily examination of kala-azar cases.

In the early stages of cancrum oris there will be found a thin grey line of ulceration along the margin of the gum in contact with the teeth, slight salivation and a somewhat foul breath. If this is treated with carbolic acid and spirit, it usually clears up and the whole process is checked, if left a few days we have a typical cancrum oris case.

In conclusion, I would draw attention to some of the results of treatment. Quinine is responsible for many cases. It is taken over long periods in the malarial districts and accounts for much indigestion and many gastric troubles. Apart from noises in the ears, vertigo, etc., which are well known, a common symptom is tachycardia. Sudden attacks of faintness, and syncope may be found to be entirely due to quinine, and not to debility following malaria, the fact being proved by stopping quinine when the attacks rapidly clear up. I also think that anæmia is sometimes due to quinine but that is difficult to prove.

Of course when we come to deal with intramuscular injections of quinine we find all sorts of disasters arising. I may say that nothing would induce me to have an intramuscular injection of quinine. There is, to my mind, no doubt that in this country tetanus has followed the most careful administration of quinine intramuscularly. I have seen a number of abscesses result from it.

Secondary hæmorrhage into the site of the injection happened in one case. It was incised as an abscess and it was only by direct transfusion after a series of hæmorrhages that the boy's life was saved. Sciatica is by no means uncommon, but the most disastrous nerve complication I have seen was a complete musculospiral paralysis following an injection

into the triceps. He was an Indian Army cavalry officer and of course had to be invalided out of the service.

Emetine also produces occasional abscesses and tachycardia, and I saw one case many years ago of peripheral neuritis which I attributed to emetine.

Now that arsenic is being so much more extensively used, I expect we shall see more cases of exfoliative dermatitis. I saw a case before the Standing Medical Board of extensive peripheral neuritis resulting in complete paralysis of the lower limbs. This was admittedly due to a course of soamin. He had then been 21 months on leave and could only walk with difficulty.

The title of this lecture is "Differential Diagnosis in the Tropics," but I seem to have said little on that subject and a good deal on other subjects. I may therefore fitly conclude by returning to the subject of the lecture. There is no royal road to accurate diagnosis, but the simplest and straightest is to recognise and profit by your mistakes. Be honest with yourself, even if there are times when you have to be discreet with friends and relatives. Professor Drummond urged that a post-mortem should be compulsory before a death certificate was granted. He stated that most death certificates were inaccurate in stating the cause of death. At any rate when you do not know the cause of death it is a good thing to try and get a post-mortem.

What are the main points to attend to in diagnosis? First and foremost, an accurate history of the present and previous illness. I have already alluded to this in differentiating between dysentery and appendicitis, but I think if you recall the case of cerebral abscess due to *Entamoeba histolytica* you will appreciate the value of an accurate history.

Secondly, get into a habit of using a microscope. This is so obvious that it would seem unnecessary to mention it, yet cases are sent over and over again to hospital, after treatment outside, without ever having had blood smears or stools examined.

While you have spare time, use it yourself and don't fall back on laboratories which do this work for a fee. If your patient can afford it, get these laboratories to confirm your findings or to rectify your own personal errors, but don't come to rely entirely on them. You may find yourself in a place where it would take days to get a reply. If you are going a long way to see a case and are not likely to see the case again take your microscope with you.

As an example of the use of the microscope:—

A small boy was brought to see me. His mother stated that for some time he had had occasional hæmorrhages from the bowel. I

asked many questions and eventually on the history given came provisionally to the conclusion that probably the cause of the hæmorrhage was a polypus of the rectum. There was no history of diarrhoea. I passed a catheter into the rectum—however—and examined the undoubted blood I found in the eye when I withdrew it under the microscope. I found *Entamoeba histolytica* in large numbers and no further examination was necessary to clear up the diagnosis.

Thirdly, a careful physical examination when the case is first seen. Your first examination is always the most careful. After a week or two you suffer from what Professor Wilkie has described as clinical staleness, and fail to go over parts you have already examined. Some men are immune to this staleness, but very few.

In the temperate zone it is usual to begin from above downwards and starting from the head go to the chest. In the tropics I think it is best to begin on the abdomen and come to that when fresh, and then proceed to other areas. The order in which you examine the organs is immaterial but it is best to follow the same routine. I usually take the spleen, liver, gall bladder, stomach and pylorus and then the appendix region and colon.

In all fevers a four-hourly chart is essential. In several cases the double rise in 24 hours has suggested kala-azar before any other signs. A culture of the blood and of the urine will often enable you to make an early diagnosis of enteric, kala-azar or bacilluria.

The physical examination is not complete without an examination of the stools and of the urine.

Fourthly, a knowledge of the geographical distribution of disease is of great value. Thus we know that the prevalent long-continued fever of Bengal is kala-azar, but in the Punjab it is more likely to be enteric or Malta fever. A bubo in the Punjab suggests plague, in Bengal we need scarcely consider it and our prognosis is considerably altered.

In the hills, relapsing fever is common in the cold weather. In lower Bengal it is almost unknown. In Scinde and Bagdad chronic sores are usually due to Leishmania infection, not so in this part of India.

In the tea-garden areas anasarca is commonly due to *Ankylostoma* infection, in Calcutta to nephritis, beriberi, or epidemic dropsy.

Lastly, to bear in mind that many tropical diseases present themselves in atypical forms which mimic other diseases. I have endeavoured here to draw attention to some of these atypical forms, but the subject is so vast that I should perhaps have been better advised to restrict myself to one disease.

At a later date I hope to discuss some of the other tropical diseases such as ankylostomiasis,

leprosy, schistosomiasis, relapsing fever, rat-bite fever and rarer conditions.

I also desire to acknowledge the help of Dr. C. C. Mitra in preparing the tables in this article.

ONE SEASON OF ANTI-MALARIAL WORK AT PASIGHAT.

By P. N. MITRA, M.B., D.T.M. (Bengal),

CAPTAIN, I.M.S.,

Pasighat, Assam.

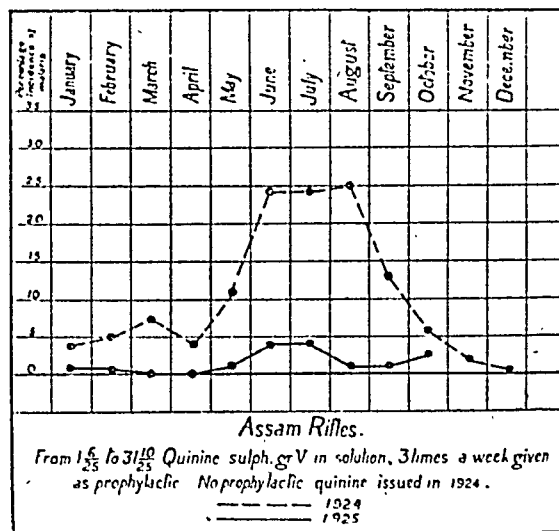
PASIGHAT is the headquarters of the subdivision of the same name within the district of Sadiya Frontier Tract in Assam. This district was formerly known as the North East Frontier District, which name gives a rough idea as to its geographical position. It is situated at the foot of the Abor Hills, on the right bank of a river of considerable size—the Dihang. The soil is sandy and porous and though the rainfall is heavy and there are a few pools and puddles, very little anopheles breeding occurs in these. Running parallel to the Dihang at a distance of about half a mile from it is a small stream called the Mora-Lalli, which is formed by the junction of about a dozen springs cropping up at the foot of a low hill range. Pasighat was originally founded by clearing the bank of the Dihang river of virgin jungle for a distance of about $\frac{1}{2} \times \frac{1}{4}$ mile. In 1915 certain parts of the banks of the Mora-Lalli were cleared of jungle for the first time for agricultural purposes. Since then jungle clearings have been and are being systematically extended, and at the present moment nearly a mile of the Mora-Lalli is clear of jungle, except at its sources where some large trees are still standing.

From 1912 to 1915 there was nothing noteworthy about the incidence of malaria in the station. Malaria was noticed to be bad at Pasighat in 1916. It became worse in 1917 and at the request of the executive authorities the Sanitary Commissioner of the province came down to investigate the matter. In January 1918 he diagnosed the disease to be malaria, identified the anophelines responsible and incriminated the Mora-Lalli to be their breeding place. He recommended, among other measures, oiling the stream, clearing the station of jungle from the Dihang to the Mora-Lalli, filling in of puddles and pools and the prophylactic issue of mosquito-nets and quinine where practicable. The anophelines identified by him were the following:—*A. maculatus*, *sinensis*, *fuliginosus*, *barbirostris*, *aikeni*, *neo-aikeni*, *listoni* and *culiciformis*. Of these *A. maculatus* predominated. For some obscure reason the task of oiling was left to a non-medical department, the officers of which had no training for this sort of work. They were using a mixture of crude and refined kerosene oils which was poured into kerosene oil tins with a hole knocked

at the bottom and fitted with a gauze wick. These wicks lost their capillarity in a short time and then acted as plugs, preventing any dripping. In addition the actual breeding places were not found out and dealt with.

In February 1925, Major D. L. Graham, O.B.E., the civil surgeon of the district, visited the station and made certain recommendations. A fresh anopheline survey was carried out. Except a very few *A. listoni*, only *A. maculatus* was detected (kindly identified by Capt. Barraud). The seepage areas at the source of the Mora-Lalli were dealt with by contour drainage and these new drains were treated, with oil putting into them perforated cigarette tins into which a handful of rag soaked in kerosene oil had been put. Practically no breeding occurred in these new drains. Breeding, however, was detected in the stream about $\frac{1}{2}$ mile from its source where it runs through grassy meadow. In this part the edges of the stream were hand weeded and sprayed with kerosene oil with the help of a garden syringe. The number of drip-cans was also increased. Two other temporary breeding places were also discovered and dealt with. Breeding was found going on in exposed springs in the bed of the Dihang river in October. This too was dealt with by oiling. The drip-cans were improved by substituting small stopcocks for gauze wicks.

The position as regards malaria is shown in the charts.



Oiling however is only palliative. Further, with increased jungle clearing the breeding ground of *A. maculatus* is likely to increase as the larvae of this species require open and clear spring water. The history of the station also points the same way. Clearing on the banks of Mora-Lalli first began in 1915 and malaria became bad at Pasighat for the first time in 1916. On account of expense the idea of putting the stream under-ground cannot be considered at present. But it is possible

that if further deforestation be stopped on the banks of the stream and the part of the stream already exposed by deforestation be permitted to relapse into jungle, in time

also to various officers of the medical and political departments, without whose co-operation this work would not have been possible.

Postscript.—Oiling was continued from April to October, each year, but in 1925 it was found that *A. maculatus* was breeding in the Mora-Lalli in November. So in future oiling should be continued till the end of November at least.

THE TREATMENT OF LACERATED WOUNDS WITHIN TWO HOURS.

By R. J. L. SLADEN, F.R.C.S., D.P.H.,
District Surgeon, G. I. P. Railway, Jhansi.

WOUNDS, usually of a lacerated nature, must necessarily be of frequent occurrence in a hospital for railway staff. From an economical point of view, it is of great importance that they should be dealt with as rapidly and efficiently as possible, so as to prevent (as far as can be arranged for) a permanently disabled condition and to return the sufferers back to duty as soon as possible.

Experience during the war demonstrated the great importance of getting them treated as soon after infliction as circumstances admitted. Within two hours it is possible so to disinfect a wound that it may heal by first intention and some of the best results were obtained by adopting the so-called B. I. P. P. treatment. After treating some cases by this method in Jhansi, and seeing an extraordinary and fortunate result in the hospital of my colleague Dr. Ambler in Bombay, a circular was issued advising its adoption in all the hospitals on the G. I. P. Railway in 1923 on the following lines:—

- (1) To stop all hæmorrhage.
- (2) Place a sterilised swab over the wound.
- (3) After thoroughly washing the hands with hot water, soap and nail brush for not less than 5 minutes, wash the surrounding skin for at least 18 inches around the wound with the same.

- (4) Wash the wound in every crevice with hot water and soap.

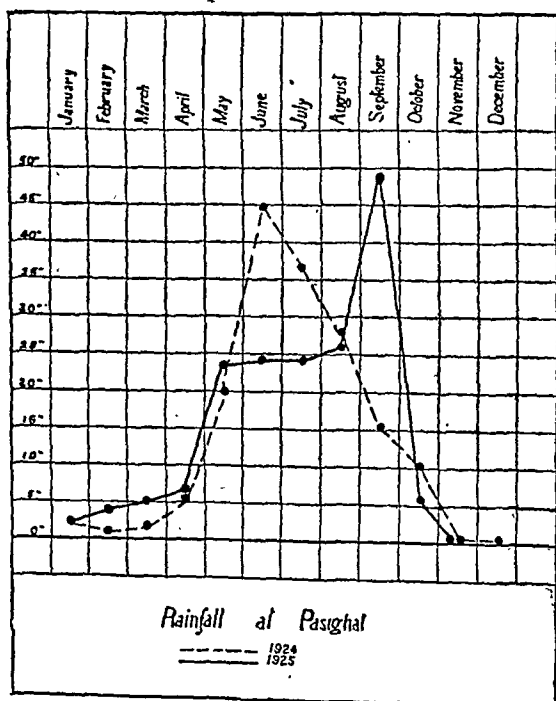
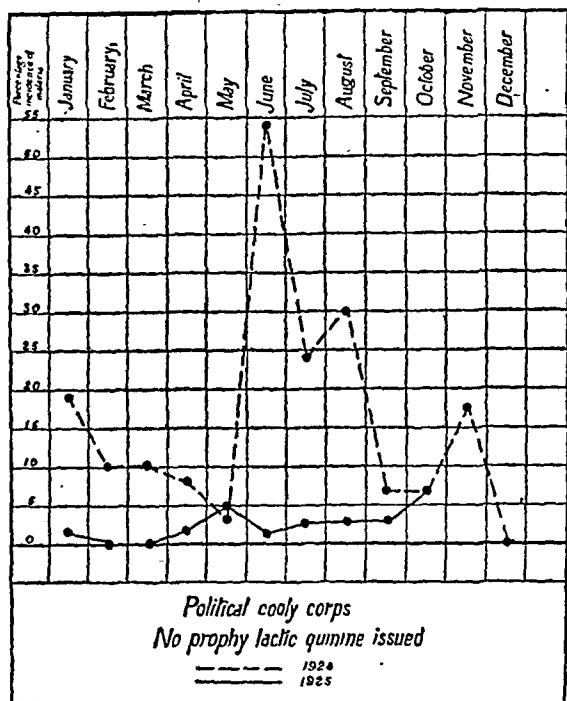
Nos. (3) and (4) are procedures which may be left out unless the wound is very dirty.

- (5) Cut away loose tags of muscles and skin with sterilised scissors and forceps.

- (6) Wash every crevice with spirit applied with a sterilised swab.

- (7) Paste every portion of the wound with B. I. P. P., applied with a sterilised swab, taking care to leave very little in the depth of the wound.

- (8) Sew the wound up. Apply tincture of iodine and dress with dry sterilised gauze or lint.



the Mora-Lalli may become unfit for *A. maculatus* breeding. Oiling of course, to be continued till then. It should be noted that *A. umbrosus* was never found here. I invite criticism from those who know on this point.

My thanks are due to Major D. L. Graham, O.B.E., and Mr. T. P. O'Callaghan, the civil surgeon and political officer of the district respectively, for constant advice and encouragement,

(9) An anæsthetic is nearly always necessary.

(10) There is frequently a rise of temperature which does not necessarily indicate that the wound is not doing well.

(11) The dressings may be left on up to a week if there is no local pain, but should be otherwise removed sooner. There is no harm in daily dressing provided the wound is kept dry and sterilised dressings applied. When re-dressing, keep the wound dry, use friars' balsam, tincture of iodine or methylated spirit.

(12) B. I. P. P. consists of:—

Liquid paraffin	..	1 oz.
Bismuth subnitrate	..	1 oz.
Iodoform	..	2 ozs.

(13) Iodoform poisoning might possibly occur, but has been most unusual.

The details of treatment were thus defined. To begin with in many cases, especially where medical subordinates did not realise how impossible it is to thoroughly clean a wound without an anæsthetic, the results were not ideal, but in spite of this it seems to have been a definite step in the right direction and materially shortened the time of healing, and I have not yet heard of a method that has produced as good results.

Writing in 1914, Russell Howard says, when there is much laceration of the wound, especially when dirt is ground into it making it almost impossible to render it surgically clean, the wound should not be closed immediately. The part should be fomented with some antiseptic lotion or kept in a continuous bath for 48 hours. Experience on the railway has shown that such treatment surely makes a suppurating condition and those treated by thorough removal of all damaged tissue, arrest of hæmorrhage, proper cleansing with spirit, and a final pasting with B. I. P. P. followed by closing with sutures ensures in the majority of cases healing by first intention if done within 2 hours, and in other cases a lesser infection than has been obtainable by other methods. I would again lay stress on time after infliction before treatment is started as being of first importance in a country like India where the hot climate favours the commencement of septic processes with such dramatic haste. Below is an extract of reports received, for permission to publish which I am indebted to Dr. James Cairns, the Principal Medical and Health Officer, whose help and sympathy in arranging for the necessary equipment has made this endeavour possible.

At Jhansi.—Dr. Haworth reports 29 cases treated on an average 8 hours after infliction, healing on an average time of 14 days; and 2 cases treated on an average $\frac{1}{2}$ hour after infliction, healing on an average time of 6 days.

DURING 1923.

	Extent of wound.	Time elapsed before treatment.	Result.
At Wardha.	1" \times $\frac{1}{8}$ "	20 minutes.	Healed (not put on sick list).
	$\frac{3}{4}$ " \times $\frac{1}{4}$ " right foot.	2 hours.	Ditto.
	1 $\frac{1}{2}$ " \times $\frac{1}{4}$ " finger.	$\frac{1}{2}$ hour.	Healed in 7 days (put on sick list).
At Nagpur.	4" long.	1 $\frac{1}{2}$ hours.	Healed within 14 days (not put on sick list).
At Katni.	2" \times $\frac{1}{2}$ " irregular.	15 minutes.	Healed in 14 days.
At Jhansi.	1 $\frac{1}{2}$ " \times $\frac{1}{4}$ "	$\frac{1}{2}$ hour.	On sick list 9 days.
	1" \times $\frac{1}{2}$ "	$\frac{1}{2}$ hour.	On sick list 7 days.
	2" \times 1 $\frac{1}{2}$ "	$\frac{1}{2}$ hour.	On sick list 14 days.
	2" \times $\frac{1}{2}$ " \times $\frac{1}{2}$ "	$\frac{1}{2}$ hour.	On sick list 11 days.
	2" \times $\frac{1}{2}$ " \times $\frac{1}{4}$ " lacerated on inner part of foot while unloading stones.	About 10 minutes.	No discharge after 14 days. On sick list 23 days.

At Mannad.—The assistant surgeon reports 35 cases, of which 25 involved muscles, 4 had fractured bones and 6 had a large artery severed: 12 of these were treated within 2 hours and 23 later. The length of time in healing was approximately 11 days.

DURING 1924.

At Harda.—Four cases are reported. The wounds were from 1 inch to 3 inches long. All were treated within 2 $\frac{1}{2}$ hours and healed quickly; the largest kept its owner only 13 days on the sick list.

At Nagpur.—Seven cases are reported with wounds up to 2 $\frac{1}{2}$ inches long, they all healed quickly. The longest time on the sick list was 13 days.

At Bina.—The only case reported was unfortunate, being apparently a not extensive wound where no anæsthetic was used. It took 75 days to heal. The size was 3 inches by $\frac{1}{2}$ inch by $\frac{1}{2}$ inch and only muscles were involved. This case goes to show how difficult it is to thoroughly clean a wound without an anæsthetic.

At Byculla.—Five cases are reported, all of severe nature; in 2 there was fracture. The longest time on the sick list was 52 days and the shortest 21 days.

At Matunga.—Forty-five cases were so treated, a larger number than previously reported from any other station in charge of a subordinate medical man, due to the fact of the patients coming almost entirely from a workshop. Details of their severity are not given and the

length of time in healing is stated to be from 12 to 58 days. No anæsthetic was given in any of these cases.

At Kalyan.—Eleven cases are reported, most of which were extensive. They healed when under observation in from 4 to 21 days, a result which does much credit to the doctor concerned.

At Jhansi.—One hundred and thirty-six cases were reported, of which 95 per cent. are said to have healed by first intention. Fifty-five more cases involved deeper tissues including muscles, of which 90 per cent. are said to have healed similarly.

Eleven cases involving bones, tendons, large vessels and nerves, of which 80 per cent. are said to have similarly healed. The average time of being off duty at this station was 9 days for the first 136, 16 days for 55, and only 3 weeks for the 11 worst cases.

BOMBAY MILLPONDS AND ANOPHELINE CONTROL.

By Capt. B. S. CHALAM,

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and

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A GLANCE at a large scale map of Bombay shows the northern half of the island to be studded over with a large number of millponds of shapes and sizes, which, however diminutive they may appear on the map, are on an average about three hundred feet by one hundred feet each. Owing to the introduction of electric drive in the Bombay mills, the majority of these ponds are no longer in use for the purpose for which they were originally meant, and form a potential source of breeding place for mosquitoes throughout the year. Luckily the species of anopheline mosquitoes found breeding in the city in the largest numbers—viz., *A. subpictus*—happens to be a non-carrier of malaria. Had it been otherwise, one shudders to think of the incalculable economic loss to a great industrial city from the ravages of malaria. As it is, the toll taken by this disease during recent years has compelled the attention of all concerned to the gravity of the malaria problem in Bombay.

Owing to the great extent of the breeding area and the profuse and various algæ growth that is seen in most collections of impounded water, control by oil or other larvicide is practically impossible. The debris and vegetation also afford protection to the larvæ against fish. Drainage or filling up of these ponds do not seem to be practicable propositions. Larvæ of *A. subpictus* and *A. stephensi* have been found thriving freely in these ponds many

a time, in addition to *Culex* and *Stegomyia* larvæ.

Remedy Suggested.—The usual methods of attack by oil, chemicals or other larvicide being impracticable, as also drainage or filling up of these ponds, we decided to adopt what was attempted very successfully in America in cases of impounded water under similar conditions. The site selected for experiment was a pond in one of the mills near Parel (Bombay) and was 270 feet long and 150 feet broad. The pond was covered with green algæ and anopheline larvæ were found with the greatest facility. An area of over 40,000 square feet had to be dealt with. On the 24th and 25th November, 1925, anopheline larvæ were found in this pond in large numbers at almost every dipping.

Use of Paris green.—On the 26th of November, 1925, we treated this pond with Paris green. Paris green is aceto-arsenite of copper. It was mixed with about 20 times its weight of fine cork dust. From what we have read of the use of it in the *Bulletins of the United States Public Health Service*, a dilution even of 1 in 100 of Paris green is said to be sufficient for larvicidal purposes. We have purposely used it fairly strong so that judging from the results of this experiment we could alter the strength in subsequent experiments. Dilution can also be made by mixing road-dust or fine sand and it is absolutely necessary that the diluent used should not be in the least degree moist, since moisture tends to cause the dust to sink. Kerosene may also be used as a vehicle for Paris green and sufficient kerosene is added to it to make a mixture thin enough to admit of being sprayed into the air. By virtue of the presence of oil, particles large or small float on reaching the water. Though a thin film of oil, even a continuous one is not sufficient to destroy larvæ, a quantity far less than that necessary to form a continuous film will suffice to float and aid in spreading the Paris green. However we prefer the dust dilution method and cork dust is an excellent diluent. Where the surface of water is free from scum a large amount of distribution takes place by air currents after the dust has reached the surface. But where the water is scum-covered a larger quantity of dust should be used. The Paris green mixture was distributed from the shore and also by means of an improvised raft in places which we could not reach from the shore.

Results.—On the 28th November 1925, two days after the treatment, we made several dippings for larvæ but could not find a single one, whereas larvæ occurred in easily measurable quantities before the treatment of the pond. On the 31st November 1925, again a very thorough search was made; 140 dippings were made and not a single larva could be found. This shows that destruction of

larvæ was practically complete. The experiment has been in part for the simple destruction of larvæ and also for the purpose of determining the time necessary for the repopulation by anopheline larvæ of areas in which larvæ have been completely destroyed. Sufficient time has not elapsed yet for determining the latter part of the experiment and this will be referred to in a subsequent note. It is also of interest to note that Paris green had no effect on aquatic insects like water-boatmen, water-bugs, etc., which were found in large numbers both before and after treatment of the pond with Paris green.

Cost.—We used 112 lbs. of cork dust and 5 lbs. of Paris green. One pound of cork dust costs about 6 annas and one lb. of Paris green costs about Re. 1-4. It took us about four hours to distribute the mixture and we employed four men for the work.

Risk of poisoning to Paris green mixers.—It is said that Paris green causes burns on the skin of parts of the body coming into prolonged contact with it and that it also causes irritation of the nasal mucous membrane. The burns are said to yield quickly to local treatment and the nasal irritation is said to disappear on discontinuing the work for a day or two. The precautions recommended are the use of simple masks over the nose and mouth during the mixing and spreading of the dust, and wearing a canvas or oilcloth apron to keep the dust out of the clothing. Also leather gloves should be used for the hands and the men should be encouraged to take a bath immediately after the operations. In the case of the labour we employed, there were no ill effects though none of the precautions mentioned above were taken. It would therefore seem that the precautions should be proportioned to the amount of contact with the dust, and in the case of persons using the Paris green only occasionally and for a short time as would be required in the control of a few ponds, it is questionable whether precautions are absolutely necessary.

Conclusion.—It would therefore appear that Paris green affords an ideal adjunct to anti-anopheline work. In the cases of large sheets of impounded water, as ponds and tanks and large swamps, where the use of oil or other larvicide would be enormously expensive and therefore impracticable, Paris green would appear to be a most valuable remedy to adopt. It is stated that domestic animals come to no harm by drinking the water of ponds treated with Paris green and that fish also are not killed by its use.

REFERENCE.

Public Health Bulletins of the United States Public Health Service.

ON THE INEFFICIENCY OF "MERCUROCHROME 220" IN THE TREATMENT OF MALARIA.

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and

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IN view of the reports on the favourable effects of "Mercurochrome 220" published in several recent papers, and especially with reference to the highly laudatory articles on the value of this drug in the *Therapeutic Gazette* in the issues of that journal for August and September, 1925, the following notes on six cases of malaria "treated" with this drug may be of interest. The patients were in the Senior Physician's wards at the J. J. Hospital, Bombay, during the month of November, 1925. The notes in the *Therapeutic Gazette* state that "the patients were discharged after a single dose, apparently cured, and with a negative blood examination."

All the cases were genuine ones of malaria, as determined by typical clinical signs and clinched by blood examination. As all of them gave almost identical results with regard to the drug, the particular type of malaria present is not of special significance. Suffice it to say that four of the cases shewed mixed benign and malignant tertian malaria infection, whilst the other two were instances of malignant tertian malaria only, every slide showing a fairly large number of parasites.

The urine before administration of the drug showed nothing particular.

In all cases a 1 per cent solution of Mercurochrome was given intravenously; the actual dose varying with the patient's weight, and being approximately 0.003 gms. per kilo. of body weight.

The samples of Mercurochrome used were:—(1) Messrs. W. Martindale's; and (2) Mercurochrome 220-soluble, of Messrs. Hynson, Westcott and Dunning, Baltimore, U. S. A.

The table appended shows the results with this toxic drug, and its inefficacy in the treatment of malaria.

In all these cases, except No. 2, quinine administration had finally to be invoked as the last resource, after which all five patients were discharged cured.

Conclusions.—(1) Mercurochrome 220 has no effect on malarial parasites, even after two doses, as in cases Nos. 1 and 3, as shown by blood examination after the reaction following upon its administration.

(2) Stomatitis and pyalism were marked features in every case.

(3) The drug appears to irritate the kidney tissue to the extent of producing mild nephritis, as was shown by examination of the urine in every case.

No. of Case.	Patient's weight. St. lbs.	Dose.	Reaction and rigor. Temperature nearly 102 F, coming down in 5 hours.	Blood (after reaction). Result of examination for parasites.	Urine after reaction.	REMARKS.
1	8 8	20 c. c. (1st day) 30 c. c. (2nd day).	Positive. Positive.	Positive. Positive.	Few R. B. Cs. and W. B. Cs. R. B. Cs. and W. B. Cs. increased.	Patient had pyalism next morning. Patient had marked stomatitis.
2	Could not be taken.	20 c. c.	Patient collapsed.	Positive.	Few R. B. Cs., W. B. Cs. and epithelial casts.	Patient was comatose from the very beginning. Collapsed heavily after the dose. Intravenous saline had no effect and he died. Autopsy showed:— (1) Splenic smears negative to malaria. (2) Acute parenchymatous nephritis.
3	7 6	15 c. c. (1st day). 20 c. c. (2nd day).	Positive. Positive.	Positive. Positive.	Few R. B. Cs. and W. B. Cs. R. B. Cs. and W. B. Cs. increased.	Pyalism followed the next day. Patient developed marked stomatitis.
4	4 6	15 c. c.	Positive.	Positive.	R. B. Cs., W. B. Cs., albumin and epithelial casts.	Marked stomatitis followed.
5	8 4	20 c. c.	Positive.	Positive.	Ditto.	Ditto.
6	8 7	23 c. c.	Positive.	Positive.	Ditto.	Ditto.

(4) It will be seen that this much-vaunted drug, which has been hailed as a veritable panacea—especially by some American physicians—in malaria, does not in any way affect the dominant position of quinine as a specific for malaria.

INDIAN DIGITALIS.

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(Indigenous Drug Series No. 8.)

Introductory.

Digitalis purpurea, commonly known as fox-glove, is a biennial herb belonging to the natural order Scrophulariaceæ, or the figwort family. It was originally a native of western Europe but is now extensively grown in many parts of the world. There are a number of species of this plant having the same physiological action, though differing in the degree of their potency. For instance, *Digitalis*

purpurea is more effective than *D. compenulata* or *D. alba*, but *D. ambigua* from Austria shows a therapeutic activity equal to *D. purpurea*. For many years, preference was expressed for the English-grown leaf but during recent years Germany and Austria have supplied large quantities of good leaf to the world. During the war the supply from the German sources was cut off and the Americans tried to develop their resources. In California, Oregon and Washington digitalis grows wild and the leaves collected from these plants were found to be active and of sufficient potency to allow their use for medicinal purposes. One of the American-grown species is *D. lutea* which, therapeutically, is as good as *D. purpurea*, in fact it has the reputation of having less toxic effects on the gastro-intestinal tract.

In India a large amount of digitalis is used every year. This can be judged from the fact that Messrs. Smith, Stanistreet & Co., a firm of manufacturing chemists of Calcutta writing in 1912 said that they alone could use 3 to 4 cwts. of the Indian-grown leaf if it was as active as the imported leaf; the consumption has gone up considerably since then. Most of the digitalis used by the medical profession in this country is imported and the

problem has not only its economic aspect, but from the medicinal point of view the fact should be borne in mind that the digitalis preparations imported into India are liable to lose 20 to 40 per cent. of their potency in a very short time(1). We undertook the investigation of the digitalis grown in India in order to see if the Indian leaf and preparations made from it could be advantageously substituted for the imported commodity. Before entering into a discussion of the therapeutic efficacy of the digitalis leaf grown in different places in India it will not, we think, be out of place to give a brief account of the cultivation, methods of collecting, drying and storage, of digitalis leaf adopted in this country.

Cultivation of Digitalis purpurea in India.

So far as is known none of the species of digitalis are indigenous to India, but *D. purpurea* has long been grown in gardens in different hill stations as an ornamental border plant. As early as 1880 attempts were made to grow the plant in the Government gardens at Saharanpur and hill gardens in Mussoorie for a regular crop of leaves for medicinal purposes. The plant, however, did not flourish as it was reported to yield very few leaves and the cost of producing was higher than that of the imported leaf. Systematic cultivation was therefore for the time being abandoned in these places. In the Kumaon gardens the plant did better and in 1912 leaves were examined chemically by Martindale and found to be well above the standard so far as the active principles were concerned. The plant was cultivated in other places and the cinchona plantation authorities at Mungpoo near Darjeeling (Himalayas) and also in Burma took it up. It was also introduced into the Nilgiri Hills and now largely grows there from self-sown seeds, and the cinchona plantations supply it to the Government Medical Store Depôts at 3 annas per pound. As grown at Mungpoo it calls for very little attention in the matter of cultivation and grows well in open spaces at a height of 6,000 feet above sea level. Thousands of seedlings appear, so nurseries for rearing are not necessary. Before planting a new block, the ground is first cleared of jungle and dug to a depth of 1 ft. Then, with the aid of a rope, pegs are put in in rows 2 ft. apart and 10,800 plants are planted per acre. The plants are grown for about 12 months, during which time it may be necessary to sickle the block twice and to hoe it once during the cold season. When grown in this way the plant does well and yields a good crop of leaves.

Collection, drying and storage of the leaf.

Collection of the leaf.—Digitalis usually begins to flower in India about the end of April, and early in May, when the plants are in full bloom and two-thirds of the flowers on

each spike are fully developed, leaf picking commences and goes on throughout the hot weather. In Europe and America the leaves are also collected throughout the summer from July to September when the plant is flowering. The best product is, however, gathered in the early part of the summer, about the month of June, just before the flowers have expanded. It was recommended that leaves should be collected from plants of the second year growth, but investigations have shown that first year leaves have the same glucoside content as those of the second year, and in India leaves are generally gathered from plants, irrespective of their age. The leaves are plucked by hand, being twisted or broken off, without taking the thick fleshy leaf-stem. The lower basal leaves of poor colour are rejected, also the upper smaller leaves of the stem. Practically three-fourths of the total number of leaves per plant are taken, both young and old being mixed during collection. No particular attention is paid to weather conditions during the collecting period. It is at the beginning of the monsoon and the weather is usually dull and showery about that time.

Withering and Drying.—Each day's collection of leaves in this country is spread in thin layers on bamboo *machans* and left to wither for 36 hours, being turned over occasionally to prevent fermentation. Finally, drying is completed in a sirocco or even at a temperature of 150° F. Without the use of the oven it would be very difficult to dry the leaves thoroughly during the monsoon. Drying in an oven, however, has been shown to cause a marked deterioration, especially if the temperature is allowed to run high. Our experience with Indian leaf is that sun or air-dried leaves, such as those from Kashmir, retain their activity very much better than the oven-dried.

Storing.—After drying the leaves are stored in dark sheds. They are kept on the floor in a heap and covered with bamboo mats to exclude dust and light. Hatcher's recent work in America appears to show that no special precautions regarding storage, such as keeping the dried leaves in air-tight tins with perforated bottles containing freshly burnt lime, are necessary in that country. In warm and moist climates such as that of India, our experience is that unless such precautions are taken the leaf deteriorates in its therapeutic activity. Digitalis leaves kept in air-tight bottles in our laboratory kept their activity better than those left exposed to the moist air, especially during the hot weather.

Therapeutic activity of Indian Digitalis Leaf.

In 1913 Dr. Gordon Sharp carried out a biological assay of digitalis grown in India. He found that the Indian-grown leaf on casual

examination looked in every way like the ordinary wild or partially cultivated variety grown in England and Germany. Their taste was equally bitter. On closer examination the Indian leaves had a coarser stalk and the venation was somewhat coarser. The leaves themselves were darker and tougher than the European leaves but not much different from wholly cultivated leaves grown in the south of England. The tinctures prepared from these leaves were darker and contained more resinous matter than those prepared from the British or German varieties. Mungpoo leaf gave good results by biological assay by the "frog method" and by therapeutic trial on the human heart. Dr. Sharp pronounced that *D. purpurea* Linn. leaf grown in Mungoo was at least equal in potency to British or German-grown leaves. The leaf grown in the Nilgiris however failed to produce equally good effects.

yet when tested by perfusing an isolated mammalian heart it produced no increase in amplitude of the heart beat and no slowing as is usual with active tincture. Dr. Cow expressed the opinion that this negative effect on the mammalian heart need not condemn the sample and that it may possess adequate therapeutic properties which in this instance are overshadowed by the muscle poison effect.

In the end of 1922 the Government of India Medical Stores Department first sent the senior writer tinctures made both from Mungpoo and Darjeeling leaves and since then a number of other tinctures made from the leaf grown in India have been assayed. The assay was carried out by a modification of Hatcher's "cat method" (3). Chemical assay was also done at the same time by Kundson and Dresbach's chemical method. The following table shows the results that were obtained.

No.	Date of Assay.	Physical characters of dilute solution.	Percentage of slowing of intact mammalian heart.	H. T. U. per c.c. of tincture.	Amount in c.c. s. equalling 1 c.c. of standard tincture.	REMARKS.
<i>A. Tinctures prepared from leaf grown in Mungpoo (near Darjeeling, Himalayas).</i>						
1	Early 1923	Dark with black particles.	..	7.9	0.82	Specimens varied in activity.
2	17-9-24	Opalescent green ..	15.0	5.2	1.25	
3	18-9-24	Ditto	12.5	3.55	1.83	Tried clinically. Patient could be got under digitalis effect with 8 to 10 drachms of tincture per 190 lbs. body weight.
4	15-7-25	Yellowish green ..	19.0	3.8	1.7	
5	17-7-25	Ditto	26.8	3.23	2.01	
6	3-9-25	Opalescent greenish yellow.	4.76	6.25	1.04	
7	Dec. 1925	Light blackish yellow.	9.1	6.69	0.972	
8	Ditto	Light greenish yellow.	7.7	3.7	1.742	
<i>B. Tinctures prepared from leaf (sun-dried) grown in Kashmir (Himalayas).</i>						
9	9-9-24	Opalescent darkish green.	56.66	9.3	0.7	Tried clinically. Patient could be got under digitalis effect with 4 to 7 drachms of the tincture per 100 lbs. body weight.
10	11-9-24	Ditto	60.5	9.7	0.68	
11	1-9-25	Opalescent greenish yellow.	38.0	6.43	1.01	
12	18-9-25	Ditto	44.0	8.44	0.77	
<i>C. Tincture prepared from leaf grown on the Nilgiri Hills.</i>						
13	Early 1923	Dark blackish with ppt.	Nil	5.8	1.12	Very toxic when assayed by the "cat method."
14	Ditto	Ditto	Nil	5.2	1.24	
15	5-8-25	Ditto	Nil	18.0	0.36	
16	6-8-25	Ditto	Nil	13.2	0.49	
17	7-8-25	Ditto	Nil	17.1	0.38	

In 1920 Dr. Douglas Cow of the Pharmacological Laboratory at Cambridge assayed tinctures prepared by Messrs. Smith, Stanistreet & Co., from the leaves grown in Mungpoo and in the Nilgiris. One c.c. of tincture made from Mungpoo (Darjeeling) leaf was found to contain 8 H.T.U. (compared with equivalent standard of 1 c.c. = 6.5 H.T.U.). Its M.L.D. per gramme of frog was 0.125 c.c. Perfusion of the isolated rabbit's heart produced 100 per cent. increase in amplitude and 25 per cent. slowing. Dr. Cow pronounced the sample to be of adequate strength, showing reasonable therapeutic properties. In the case of the Nilgiri leaf he found that although by the "frog method" the tincture was found to be nearly double the strength of ordinary tincture—12.5 H.T.U. in a c.c. instead of 6.5—

DISCUSSION OF THE TABLE.

A perusal of the table will show that 17 specimens of digitalis leaf grown in India were assayed during the past three years. Eight of these specimens were from Mungpoo near Darjeeling, Eastern Himalayas; four from Kashmir, Western Himalayas; and five from the Nilgiri Hills in Southern India. It will be seen that the specimens from Mungpoo varied a great deal in their activity when tested by the "cat method." Some specimens (Nos. 1, 2, 6 and 7) were quite active, while the others (Nos. 3, 4, 5 and 8) were comparatively weaker. Slowing of the mammalian heart with these tinctures was also variable and was not so marked as in the case of Kashmir leaf preparations. These variations, in our opinion, were due to the method of drying and storing

adopted, which we have already described. It is difficult to maintain a perfectly uniform temperature in the ovens that are used, and if the temperature rises above 150° F. deterioration of the glucosides occurs, accounting for the loss of potency of the specimens. Storage of leaf also appears to have some bearing. Under the present conditions the leaf after drying is simply heaped up on the floor in darkened rooms and although the atmospheric temperature does not rise so high in the hills as it does in the plains, it becomes quite warm at times and as the air is full of humidity, fermentation is favoured and the glucosides are split up. These factors, in our opinion, are sufficient to account for the variations in the therapeutic efficiency of different specimens of leaf. Clinical trials with tinctures made from Mungpoo leaf showed that patients could be digitalised with reasonable quantities of this preparation (8 to 10 drachms per 100 lbs. body weight). We are of opinion that good quality of digitalis leaf can be grown in Mungpoo, and with improvements in methods of drying and storing adequate and reliable supplies could be obtained for therapeutic uses from this source.

The specimens of leaf from Kashmir gave excellent results both by biological assay and clinical trials. In Kashmir digitalis is not grown on a large scale and the specimens we examined were grown purely for experimental purposes. The leaves were dried in the sun and sent to us in air-tight tins. Kashmir is not affected very much by the monsoon, as in the Eastern Himalayas where Mungpoo is situated, and drying in the sun without the use of ovens is possible. The possibilities of growing digitalis in Kashmir would be worth considering. Freshly made tinctures from this leaf digitalised patients with 4 to 7 drachms per 100 lbs. body weight.

All specimens of leaf grown in the Nilgiris were very toxic and the lethal doses by the "cat method" were very small; there was hardly any slowing of the heart, which is an indication of its therapeutic activity. We are trying this tincture clinically in a series of cases in order to see if the negative effects on the mammalian heart mean that it does not possess adequate therapeutic efficacy.

SUMMARY AND CONCLUSIONS.

(1) Digitalis leaf of good quality grows in the valley of Kashmir (Northern Himalayas) and at Mungpoo (Eastern Himalayas).

(2) The leaf grown in the Nilgiri Hills is not so good when tested by methods of biological assay. Further clinical trials are recommended before the leaf can be finally condemned. The negative effect on the mammalian heart under experimental conditions may be overshadowed by the muscle

poison effect, and this may not occur when the drug is given by the mouth.

(3) Improvements in methods of drying and storage are recommended to get a uniform quality.

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CONGENITAL YAWS.

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DURING the last six years I have come across many hundreds of cases of yaws amongst patients of all ages from a baby of 2 days old to persons of 75 or 80 years of age, in this district. Several babies brought into the Native Civil Hospital by their mothers in the first week of their life shewed peculiar yaws eruption on their bodies. Enquiries were made in each case in order to be sure whether they were suffering from congenital syphilis or not. I also tried my best to get some information from the parents as to whether they had suffered from syphilis previously or not. A thorough examination of the parent where possible was carried out, but did not disclose any evidence of syphilis, and in many cases the mothers gave the history of their having suffered from yaws. A few of them had been treated by me at this hospital as in-patients previously. Of course I believed those whom I could recognise and traced their names from the old records. At one time there were many children in the ward with their mothers suffering from yaws, and it happened that the Deputy D. M. S., Dr. C. J. Wilson, M.C., M.B., Ch.B., B.A., was at the station. I took this opportunity to settle my doubt, and showed him a few cases in the wards of this hospital in presence of the medical officer then in charge (the late Dr. B. W. Dakers), cases which I thought to be cases of congenital yaws. Dr. Wilson took particular interest and examined these cases. His reply was that there is no such thing as congenital yaws; on the other hand, he challenged me to bring to light a case with definite proof. Ever since I kept a watchful eye on every case of yaws and syphilis amongst babies. I consulted almost all the books that I could get on the subject, as also a text book of bacteriology, from which I quote as follows:—"Yaws is apparently not hereditary" (Byam and Archibald, *The Practice of Medicine in*

the Tropics). "Congenital yaws never exists, but a case is known suggestive of congenital transmission" (Dr. R. L. Spittal, Surgeon General Hospital, Colombo, Lecturer, Ceylon Medical College, in his book on *Framboesia Tropica*). "Yaws is neither hereditary nor congenital. A pregnant mother suffering from yaws does not give birth to a child suffering from the disease, nor one which will subsequently develop yaws unless the virus be first introduced directly through a breach of surface after birth" (Manson's *Tropical Medicine*, 1925).

Recently a baby was brought to me for treatment of yaws, two weeks old. The mother of this baby suffered from yaws about six months previously and was treated by me. Personally I am also acquainted with the father who suffered from syphilis about six years ago and had several courses of anti-syphilitic treatment with N. A. B., etc. He had two children born of his first wife, and they were both healthy. The third one is the baby referred to above, born of his second wife. I consider this baby to be suffering from yaws, probably of congenital transmission. The causal organisms are almost the same in both yaws and syphilis. Under the circumstances I fail to understand why yaws may not be of congenital origin, when syphilis often is of congenital origin.

Will other observers bring to light any other cases which may come to their notice, through the medium of your journal?

ANTIMONY AND FILARIASIS.

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The Pochiraju Hospital, Berhampore.

It is regrettable that no remedy has yet been discovered to cure filariasis. This disease is very protean in its manifestations. Surgical aid, even where it is possible, does not seem to be an unmixed blessing. I have been trying antimony for the last four years in several cases and wish to note my experiences.

Antimony improves the lymphatic circulation in the regions affected with filaria. It may be that the filarial ova which are the chief cause of lymphatic obstruction are destroyed, and hence the improvement noticed after antimony injections. Filarial lymphatic glands subside very rapidly with antimony. I have also noticed that chronic ulcers over elephantoid limbs heal very rapidly with one or two injections. Chyluria and lymph scrotum show marked improvement. Lymphorrhagia stops miraculously with a few injections. Filarial orchitis improves a great deal with antimony.

Recently in a case of hydrocele I tapped the fluid and injected into the sac 3 grs. of sodium antimony tartrate in 10 c.c. of water. After

a slight swelling which lasted a fortnight the hydrocele was cured. The patient was not kept in bed and he was looking after his ordinary duties.

Method of injection.—Sodium antimony tartrate, scale preparation, is used and 1 to 1½ grains in 5 to 10 c.c. of distilled water is injected intravenously twice a week. Of late I have tried urea-stibamine and hope to get better results with a smaller number of injections. Joint pains are a marked symptom in many cases after 7 or 8 injections. Immediate cough and vomiting a little later on are quite common. With urea-stibamine I did not notice much cough or vomiting and as for joint pains, I have not yet tried a sufficient number of injections to decide on the matter.

In conclusion, I have not found till now any drug which is as efficacious as antimony to cure filariasis. The fact that several injections of antimony have not made the blood free from microfilariae may not militate against antimony treatment if it can cure the patients from the pathological effects of filariasis leaving microfilariae in the blood, as many persons harbour the filarial parasite with microfilariae in their system without any of its pathological manifestations.

THE TREATMENT OF CERTAIN CASES OF INTESTINAL OBSTRUCTION WITH BELLADONNA.

By B. D. PANDE, L.M.S.,
Offg. Civil Surgeon, Mainpuri.

BELLADONNA has a triple action on the intestines:—(1) It opens the gates, i.e., relaxes the sphincters; (2) it diminishes the spasmodic narrowing of the large intestines; and (3) it antagonises the vaso-constrictor action of the intestinal bacterial toxins and thus acts as a physiological antidote to them. The drug should be pushed to its full physiological effects, the result being most satisfactory if the treatment is started early.

A very large proportion of cases of intestinal obstruction yield readily to belladonna, but at the very outset have to be distinguished from the condition designated as "ileus." Whereas intestinal obstruction is a local condition causing stoppage of the intestinal current at a certain point, ileus on the other hand is a symptom-complex of toxæmia initiated by obstruction of the intestines chiefly by mechanical causes. The toxæmia is due to products absorbed from the upper intestine, especially the lower duodenum and upper jejunum.

To diagnose whether the obstruction is due to mechanical causes, an enema is administered of some irritating substance such as magnesium sulphate after washing the stomach in cases of toxic vomiting until the return is clear. In cases of mechanical obstruction

which sooner or later culminates in ileus, the gastro-intestinal tract being hypersensitive, this stimulus will cause prompt resumption of the vomiting and also cause pain in the region of the obstruction. If the obstruction is paralytic or simply toxic, the stimulus afforded by such an enema will provoke no result. The tract being hyposensitive, no pain will be caused nor will vomiting be resumed.

Reliance on other symptoms besides those

Whereas the former condition (intestinal obstruction) yields readily to intensive treatment with belladonna in massive doses, in the latter condition (ileus) nothing short of a prompt jejunostomy will ameliorate the symptoms.

Whenever the action of belladonna was found to be defective, physostigmine and pituitrin in combination have hastened the cure. One or two hypodermic injections at a few hours' interval suffice.

The following list well illustrates the effects of belladonna in cases of intestinal obstruction not advanced to the stage of ileus.

No.	Names.	Date of admission.	Date of discharge.	Results.	Approximate dose of belladonna, administered as tincture.	Symptoms.
1	Bhupal ..	12-2-23	14-2-23	Cured.	Dr. iss	Acute.
2	Shiv Charan ..	24-1-23	14-2-23	Do.	„ iss	Do.
3	Bhikambar ..	7-4-23	10-4-23	Do.	„ iii	Do.
4	Ram Charan ..	22-5-23	7-6-23	Relieved.	„	Chronic tuberculosis of intestine.
5	Bihari ..	3-7-23	5-7-23	Cured.	„ iii	Sub-acute.
6	Phagu ..	3-7-23	6-7-23	Do.	„ ii	Acute.
7	Shyam Lal ..	10-9-23	16-9-23	Do.	„ iii	Chronic.
8	Sumera ..	12-9-23	16-9-23	Do.	„ iss	Sub-acute.
9	Pitambar ..	17-9-23	20-9-23	Do.	„ iss	Acute.
10	Tika Ram ..	17-9-23	20-9-23	Died.	„ ii	Do.
11	Gulsher Beg ..	2-11-23	5-11-23	Cured.	„ ii	Do.
12	Ganga ..	23-12-23	29-12-23	Do.	„ ii	Sub-acute.
13	Rup Ram ..	22-12-23	24-12-23	Do.	„ ii	Do.
14	Mohan ..	17-11-23	20-11-23	Do.	„ i	Do.
1924.						
1	Jhanda Singh ..	26-1-24	3-2-24	Cured.	„ iss	Acute.
2	Gokul ..	14-3-24	18-3-24	Do.	„ ii	Sub-acute.
3	Bhikari Das ..	29-4-24	1-5-24	Died.	„ iii	Acute.
4	Jalim Singh ..	9-5-24	13-5-24	Cured.	„ ii	Do.
5	Shiam Lal ..	11-6-24	13-6-24	Relieved.	„ ii	Do.
6	Hira Singh ..	25-7-24	31-7-24	Cured.	„ iii	Sub-acute.
7	Puran ..	22-8-24	24-8-24	Do.	„ ii	Acute.
8	Chhidda ..	17-10-24	23-10-24	Do.	„ i	Chronic.
9	Sujan Singh ..	20-12-24	26-12-24	Died.	„ ii	Acute.
10	Mangal Sen ..	26-12-24	28-12-24	Cured.	„ ii	Do.
1925.						
1	Chirani ..	3-3-25	4-3-25	Cured.	„ ii	Acute.
2	Nand Kishore ..	7-3-25	9-3-25	Do.	„ ii	Do.
3	Budha ..	12-3-25	14-3-25	Do.	„ ii	Do.

of obstruction is put upon (1) pain, (2) tenderness, (3) rapid pulse, (4) severe shock, (5) vomiting, and (6) rigidity. These are all exaggerated in ileus.

Remarks.—All these cases were treated at the Sadar Hospital, Aligarh.

Treatment is started by administering xxx doses in a little water every hour till

physiological symptoms appear, when physostigmine and pituitrin are exhibited if the bowels do not start acting. In a certain proportion of cases where the bowels do not act of themselves, in order to start their action enemas of soap suds in lukewarm water should be given frequently, and also at intervals high rectal enemas to which a liberal amount of castor-oil or sweet-oil is added. This facilitates the easy passage of a hard faecal mass which may be acting as a plug. If the belladonna is not well tolerated owing to extreme sensitiveness of the stomach, hypodermic injections of atropine should be first started and then followed by belladonna by the mouth which is the route that is generally followed.

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A Mirror of Hospital Practice.

A CASE OF SNAKE-BITE DUE TO *LACHESIS CANTORIS*.

By A. BAYLÉY-DE CASTRO,

Junior Medical Officer, Haddo, Port Blair.

MANY cases of snake-bite are annually treated in the hospital at Haddo, but as is usual the snake is never brought for identification and the majority of patients have failed to observe any particulars, or characteristics of the creature that has bitten them. An exception to this rule however occurred on the 30th July, 1925, when prisoner No. 32,315 came to hospital after being bitten by a *Lachesis cantoris*, identified as such.

He had been bitten between the third and fourth fingers of the right hand at 3 p.m. on the 29th July. At nine o'clock that night he had severe vomiting which according to his statement was of a bitter greenish-coloured fluid. He had spent a sleepless night due to excruciating pain in the arm.

On arrival at the hospital (11-15 a.m. 30-7-1925) the whole of the right arm was found to be very swollen, tense, and oedematous. Bullæ were found around the elbow joint, also posteriorly along the upper arm above, and the back and ulnar half of the forearm below. Temperature 98°, pulse 100, respiration 30; the patient was in great pain and was very restless. No abdominal pain was complained of nor was any tenderness elicited on palpation.

The pain extended up the arm from the fingers, then across the shoulder under the clavicle; also the course of the bullæ appeared to follow the line of the ulnar nerve, going up into the brachial plexus.

5 p.m.—Temperature 98°, pulse 98, respiration 20. There was a general reduction in the pain, and a slight abatement in the swelling around the shoulder. Patient was still restless. Suffered from constant eructation, the abdomen was slightly distended, and flatus was being passed. The bowels had not moved, but he had urinated twice. There had been no vomiting since admission. I am not certain whether the abdominal discomfort (eructation and flatulence) was due to involvement of the splanchnic nerves.

31st July, 1925.—Morning temperature 98°, pulse 88, respiration 20. Patient did not sleep till after midnight because of the pain. This morning he has none, but is still restless. The treatment adopted so far has been free incisions, and arm baths in a warm 5 per cent. potassium permanganate solution, one intravenous injection of calcium chloride (1 in 20), drinks of hot milk, and 2 oz. of rum b.d. A purgative of calomel grs. 6, followed by magnesium sulphate 6 drs. was also administered.

31-7-1925 (continued).—Evening temperature 98.4°, pulse 84, respiration 20. Bowels were moved thrice after the calomel, the stools being loose and yellow, there is no flatulence now. Restlessness has also gone. There has never been any epistaxis or subcutaneous hæmorrhages.

1-8-1925.—Morning temperature normal, pulse 86, respiration 20. The only swelling to-day is in the forearm and fingers, and that too is rapidly going. From to-day only antiseptic compresses are being used. The anxious expression has also left the patient.

Evening temperature 101°, pulse 92, respiration 22, benign tertian malarial parasites found in the blood.

2-8-1925. From this date onwards there is nothing further of interest to record about the case. No slough came away from the forearm and hand where the incisions had been made. The patient was finally discharged from hospital on the 20th August 1925.

The course of the pain from the fingers upwards seemed to have travelled along the course of the ulnar nerve and then the brachial plexus. I think it possible that the abdominal discomfort, flatulence, distension and eructation may have been due to involvement of the splanchnic nerves, but why so long after the bite I cannot understand.

From the notes on the case it will be seen that the respiration and pulse were both slightly accelerated. How much fright accounted for this cannot be said. That there should have been no sloughing is also a point to note. One other common snake in these Islands is the *Lachesis purpureomaculatus* (Gray's pit viper), and I am hoping before long to have the opportunity of recording the effects of the poison of this viper also.

Postscript.—Since writing this article I have been in correspondence with Colonel F. Wall, I.M.S., who is of the opinion that the three snakes *L. gramineus*, *L. purpureomaculatus*, and *L. cantor* can hardly be considered distinct species, and that the two latter are merely insular forms. A careful analysis of the lepidosis of the three shows only differences in the scale rows.

A CASE OF PERSISTENT HICCOUGH TREATED SUCCESSFULLY BY INJECTIONS OF NOVOCAINE INTO THE PHRENIC NERVE.

By D. M. GHOSE,

Assistant Surgeon, Sitamarhi, Muzaffarpore.

Hiccough is caused by clonic contractions of one or both sides of the diaphragm, and therefore the diaphragm should be examined with x-rays before undertaking any surgical measures for the relief of this disorder. A case of intractable hiccough came under my treatment some time ago. Jasodia, a local Brahmin girl, was seen in consultation with a local practitioner. Her condition was very bad, as she could not retain any food or even water in the stomach for the previous two months, the duration of the hiccough being nearly $3\frac{1}{2}$ or 4 months. It is amazing how she could keep up her nutrition for such a length of time without practically any food. She was also treated at two other headquarters stations for some time without any appreciable benefit. Her father as a last resort brought her back to this place. She was at that time reduced to a state of profound exhaustion and she had at times great pain in the region of the diaphragm. The urine and stools were practically stopped for more than a week. Ice was tried and even that could not be retained. The hiccough used to stop during the short snatches of sleep she had at night. She had no fever, the face was rather pale and slightly œdematous with a trace of albumin in the urine. There was nothing abnormal in the heart or lungs. The nervous system was slightly defective as she could not speak properly, and some of the reflexes (especially the knee-jerks) were slightly exaggerated.

When all remedies like morphine, chloral, gelsemium, cocaine, etc. failed, acting on the suggestion of Kroh, I infiltrated the phrenic nerve with novocaine injections ($\frac{1}{2}$ —1 per cent. solution, 2 to 4 c.c. dosage) on one side of the neck. This brought on a transient pain in the shoulder of the same side and the chest. Next day 3 c.c. was injected on the other side. With the third injection there was found some improvement in that she could retain ice, and the number of contractions was less frequent. Encouraged by this result I repeated the injections daily till altogether six were given,

when the hiccough completely subsided. She could then retain liquid food. Of course she was being fed up with nutrient enemata for some days before the injections were started but these had to be abandoned as her parents and relatives did not like them. The patient has had no relapses of this disorder now for eight months after this stoppage.

The following is the technique of Kroh, which I followed in the above case:—

The needle is inserted about 2 finger-breadths above the clavicle, close to the outer border of the sterno-mastoid muscle. The anæsthetic is injected as the needle is thrust vertically towards the scalenus anticus muscle on which the phrenic nerve lies, the depth to which the needle is passed being 2 to 4 cms. according to the amount of fat in the neck. When the phrenic nerve is reached the patient complains promptly, as a rule, of transitory pain in the shoulder and region of the heart; sometimes also in the upper abdomen. It is not incumbent on the operator to make sure that the injection is strictly intraneural, for an infiltration anæsthesia of the structures about the nerve is adequate. Kroh further advocates unilateral or bilateral partial phrenicotomy if the above simple procedure fails. Kroh does not give the dosage and the strength of the solution of novocaine but I adopted $\frac{1}{2}$ to 1 per cent. solution and made the first dose 2 c.c. and increased to 4 c.c. gradually.

TWO INTERESTING CASES OF LIVER ABSCESS.

By MATLOOB KHAN, I.M.D.,

Jemadar, Barsar Dispensary, Kangra District.

IN view of the report in the *Indian Medical Gazette* for October 1924, p. 488, by Captain A. Sargood Fry, I.M.S., of spontaneous absorption of large abscesses of the liver under emetine therapy alone, without even aspiration, the following two cases may be of interest. In the first a large abscess was present, and, with the exception of 1 c.c. of pus withdrawn by a hypodermic syringe in order to confirm the diagnosis, cleared up spontaneously on emetine therapy alone, without aspiration; in the second, invasion of the lung had occurred, but yielded completely to emetine therapy.

Case 1.—Gobind, aged 46, Hindu male, a cultivator, was admitted to hospital on 5th January 1925. On admission he was bed-ridden, very much emaciated, sallow and anæmic. There was no history of previous dysentery or diarrhoea, but the bowels were habitually irregular, even constipated.

In the right hypochondriac region was a prominent bulging swelling, extending downwards to within one finger-breadth of the umbilicus, occupying a large part of the left hypochondrium also, extending in the right axillary line to $5\frac{1}{2}$ finger-breadths below the

costal margin, and above to the 5th rib. At the back the dullness reached to $1\frac{1}{2}$ inches above the inferior angle of the right scapula. The abscess was pointing near the junction of the 9th costal cartilage. There was deficient expansion of the right lung and bulging of the right side of the chest. The evening temperature was 101° F., and oedema was present on the legs. Thus there was no doubt that a very large abscess of the liver was present. The area was also very tender on pressure. The duration of symptoms had been three months: they had become very acute during the previous 20 days.

The patient was immediately put on to emetine hydrochloride gr. 1 hypodermically daily, whilst a mixture containing ammonium chloride, potassium iodide and belladonna was given orally. Relief was immediate and amazing. After the 3rd injection and third day of treatment the temperature became steadily normal the patient slept well, pain disappeared, and his appetite was good. He refused, however, to submit to the experiment of trying treatment with emetine alone, without any measures being taken to evacuate the pus, and even made the accusation that the diagnosis was wrong. Accordingly liver puncture was performed with a hypodermic syringe only on the 5th day after admission in the 7th costal interspace in the right mid-axillary line, and the pus was shown to the patient. Only 1 c.c. of pus was withdrawn, and that solely in order to satisfy the patient's demands.

On the sixth day there was evidence of pleural irritation, and probably some pus had escaped into the pleural cavity. The patient complained of renewed pain and was very restless. Morphia and atropine were given hypodermically. Despite his protests, however, I refused to aspirate the pus, believing that the condition would clear under emetine therapy alone. By the ninth day after admission, all pain had gone, and the patient was comfortable.

The subsequent course of the case was uneventful. A second course of 12 daily injections, each of 1 grain of emetine hydrochloride, was given between the 19th February and 2nd of March. In all he received 24 injections, each of 1 grain of emetine hydrochloride subcutaneously. The abscess became slowly absorbed, and the swelling gradually disappeared. He was up and walking about with a stick on the 25th January, (20th day after admission). Expansion of the right lung improved only gradually. He was discharged from hospital on the 2nd March. At that time the liver dullness extended only half a finger-breadth below the costal margin and the left hypochondriac swelling had completely disappeared. He was seen again as an out-patient on the 13th of March and 31st March. By the latter date he was working in

the fields, there was no evidence of any enlargement of the liver, the border of which had sunk below the costal margin; the expansion of the right lung was satisfactory, and he appeared to be in sound health.

The case is a very interesting one from several points of view. Only 1 c.c. of pus was withdrawn, and that merely to satisfy the patient as to the diagnosis. The first course of 12 emetine injections probably killed the entamoebæ and subsequently the sterile abscess slowly resolved of itself during the next month and a half. A marked feature of the case was the patient's improvement in weight, despite the absorption of this very large abscess: on January 23rd his weight was $42\frac{1}{2}$ seers; on February 8th it was $44\frac{1}{2}$ seers.

Case 2.—Bishan Dai, Hindu female, aged 14 years, was first seen as an out-patient in December, 1924. There was no history of previous dysentery or diarrhoea, and no family history of importance. She then complained of fever and of a painful swelling in the right hypochondrium. A diagnosis of liver abscess was made, and emetine injections advised. To this her parents refused to consent.

In March 1925, she was shown to Capt. H. Chand, I.M.S., Civil Surgeon, Kangra, who also made the same diagnosis and advised emetine therapy. The parents again refused to allow this.

On the 2nd September 1925 I saw her at her home, as the parents refused to bring her to hospital. I found her in a state of acute agony and with high fever, a temperature of 104° F. She was profoundly anæmic and slightly jaundiced. The tongue was coated and furred, the appetite was almost nil, and she had had very little sleep. Occasional attacks of hæmoptysis and coughing up of pus were present. Respiration was hurried and 36 per minute. The right side of the chest was partly immobilised, on percussion dull all over the lower lobe, vocal resonance ++, vocal fremitus ++++. A diagnosis was made of hepatic abscess bursting into the right lung with secondary pneumonia. The parents were urged to send the child into hospital, but again refused. She was accordingly treated as an out-patient, being brought to the hospital daily in a dooly.

Treatment was commenced by a daily purgative and emetine hydrochloride, gr. 1 hypodermically daily for 12 days. A stimulant expectorant mixture was given by the mouth.

For the first two days, relief was but slight, but the third and fourth days showed tremendous improvement in the patient's condition. The temperature came steadily down by lysis, and reached normal on the 10th day, subsequently to which it did not rise again. Hæmoptysis and expectoration steadily diminished and pain disappeared; sleep was normal and the appetite became good. For a month after

the temperature became normal she was given a mixture containing potassium iodide, belladonna and expectorants, with ammonium chloride. The symptoms gradually subsided and the chest cleared.

A second course of emetine injections was advised at a later date, but the patient did not attend for it. She was last seen on the 16th December 1925. There was no fever and her general physical condition was good, whilst she was working at her daily duties. The right lung was completely clear. The liver, however, was still enlarged to $3\frac{1}{2}$ finger-breadths below the costal margin with slight tenderness on deep pressure.

I am indebted to Captain H. Chand, M.C., I.M.S., Civil Surgeon, Kangra, for permission to publish the notes on the first case.

A CASE OF CERVICAL RIB CAUSING UNILATERAL BRACHIAL NEURITIS: OPERATION WITH AMELIORATION OF SYMPTOMS.

By J. N. SEN, M.B. (Cal.), M.R.C.S. (Eng.), L.R.C.P. (Lond.),

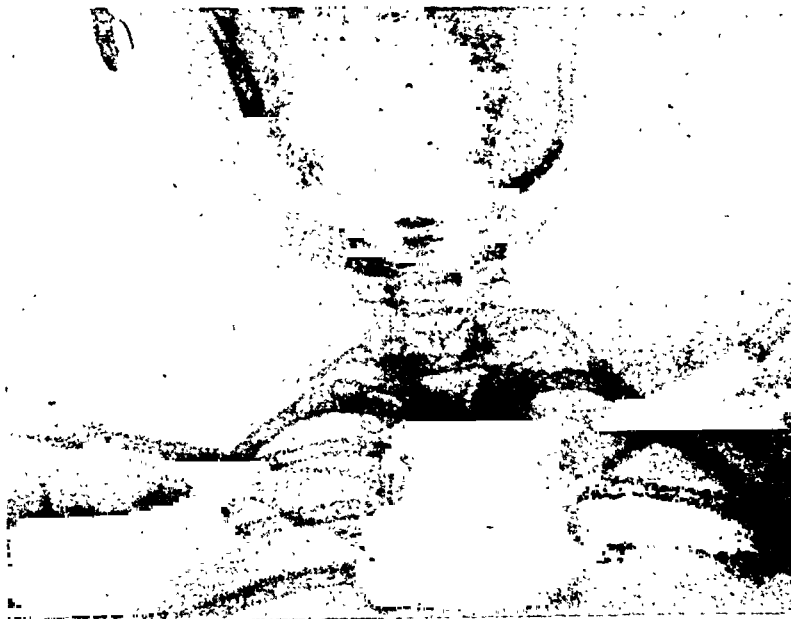
Deputy Chief Medical Officer, Tata Iron and Steel Co., Jamshedpur.

A BENGALI gentleman, one of Tata's employees, came to my consulting room in July

hand were wasted and she complained of pain along the whole length of the right arm. In the course of my examination I came upon a hard elongated mass on the right side at the root of the neck, pressure over which caused pain along the arm and obliteration of the radial pulse. Not having any x-ray apparatus in the equipment of our hospital I asked the husband of the patient if he could take her to Calcutta for an x-ray photograph to confirm my suspicion of the presence of a supernumerary seventh cervical rib.

Owing to the straitened circumstances of the man he agreed to my proposal rather reluctantly and he brought me a plate after a fortnight or three weeks. The photograph is herewith appended, which shows the presence of a complete cervical rib on the right side and an incomplete one on the left side; the distal portion of which does not show in the photograph, probably owing to its fibrous condition, which also accounts for the absence of any symptoms on the same side. The following is the history of the patient after she was admitted to hospital.

Mrs. C., aged 20 years, married, admitted for the treatment of pain in the right upper extremity extending from the right shoulder-blade up to the fingers of the right hand, more along the inner side of the limb. She



last and asked me if I could give him some good liniment for pain in his wife's arm from which she had been suffering for a long time. On questioning him in detail he told me that in addition to the pain the right hand looked much thinner than the left. Thinking it to be a case of some nervous disease I told the man that I would come and see his wife. A week or so after I saw the patient in her house and found that the intrinsic muscles of the right

describes this pain as being of a gnawing character and says that she has been suffering from it for the last 5 or 6 years without any impairment of muscular strength or tactile sensation. The pain is relieved by pressure over the affected limb. For the last year and a half this pain has increased in intensity. At times the pain is very slight, especially after perfect rest of the limb, and at other times it gets worse, especially when she hangs the

limb for a long time or after manual work. For the last year and a half she has noticed that the right hand is getting thinner with slight loss of muscular strength. She has also been feeling a tingling and numbness along the arm for the last year and a half.

Present condition.—She is a well-nourished young woman of 20, mother of one child. There is nothing particular to note about her family or personal history. The thoracic and abdominal organs are normal.

Nervous system.—There is no alteration in tactile or painful sensation in the affected limb, neither is there any change in the temperature sensation. The thenar and hypothenar muscles of the right hand are atrophied, especially the hypothenar muscles. The interossei muscles are also atrophied. The muscles above the wrist are unaffected. The pupils are equal on both sides. There is no abnormality in any of the superficial or deep reflexes.

DIFFERENTIAL DIAGNOSIS.

(1) Brachial neuralgia. The atrophy of the small intrinsic muscles of the hand at once removes the case from the category of brachial neuralgia.

(2) Progressive muscular atrophy. The absence of paralysis of other groups of muscles in the forearm and upper arm in spite of the long duration of the disease differentiates it from progressive muscular atrophy.

(3) Syringomyelia. The absence of dissociative anæsthesia and of trophic and vasomotor disturbance excludes it from syringomyelia affecting the 8th cervical and first dorsal segments of the cord.

(4) Acute poliomyelitis can be excluded by the absence of fever, headache, vomiting, and convulsions.

(5) Peripheral neuritis is generally bilateral and sensory symptoms are more marked.

(6) We have then only to consider the big class of brachial neuritis. Let us take one by one the causes of brachial neuritis:—(a) Tumour in the posterior triangle of the neck; (b) glands in the axilla; (c) aneurysm of the subclavian artery; (d) malignant disease or caries or gumma of the cervical vertebrae; (e) cervical pachymeningitis; (f) spinal tumour or spinal gliosis; and (g) cervical rib.

(a), (b), (c) and (d). There was no evidence of tumour nor could any enlargement of the axillary glands be discovered nor any sign of aneurysm of the subclavian artery to account for the symptoms; caries and malignant disease of the spine are excluded by the absence of any deformity or pain over the cervical spine. (e) Cervical pachymeningitis is generally bilateral. (f) Spinal tumour and spinal gliosis can be excluded by the absence of any cord symptoms. (g) Cervical rib was presumably the cause of the neuritis, as an elongated mass could be felt at the root of the neck,

which presumption was corroborated by the x-ray photograph.

Operation.—On August 22nd, a vertical incision was made over the brachial plexus in the posterior triangle of the neck on the right side. The incision was deepened until the levator anguli scapulæ and scalenus medius were defined. The external jugular vein was held aside. The brachial plexus was defined and the middle portion of the cervical rib exposed. Owing to the difficulty of space in the operation area a transverse incision was made along the superior border of the clavicle, commencing from the lower angle of the former incision right up to the sternocleidomastoid muscle. The flap of skin was turned to the inner side. The external jugular vein had to be ligated and cut as it was coming in the way. The posterior belly of the omohyoid was hooked down. The subclavian artery was pressed down by the assistant. The brachial plexus was pulled aside and about an inch of rib, which was lying against the brachial plexus was defined. Not daring to go any further up and down the rib for fear of wounding the dome of the pleura and to avoid severe traction on the brachial plexus that portion of the exposed rib was excised with a rongeur and bone-forceps. This freed the brachial plexus from immediate pressure of the rib. The wound was closed in the usual way. She made an uneventful recovery except for a rise of temperature on the 4th day up to 102°F. which was due to malaria as proved by the examination of her blood. Full doses of quinine checked the fever and she was discharged on 31st August, 1925.

Remarks.—The immediate result of the operation on the second day was disappearance of all pains. She was free from pain till she left the hospital. At the time of writing I hear that slight pain has returned over the upper arm. If the pain increases I intend to tackle the proximal portion of the rib from behind if the patient agrees to the operation.

Since writing the above I saw the patient about a month ago and she is now quite free from pain and does all her household duties.

My thanks are due to my assistant Dr. P. N. Sen Gupta for compiling these notes for me and to Rai Bahadur Dr. S. Chakravarti, the Chief Medical Officer, for his suggestions and help in the operation.

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A CASE OF VESICAL CALCULUS WITH ENLARGED PROSTATE IN AN OLD MAN.

By KHUSI RAM,

Assistant Surgeon, Shorket Hospital, Jhang District.

An old dhobi named Mohammed, son of Ali, 85 years of age was brought to this hospital

with retention of urine, and in a state of considerable emaciation. On examination a small calculus was found impacted in the urethra near the urethral orifice. This was removed with some difficulty and only after enlarging the orifice, and the patient could then micturate, but I suspected another stone in the bladder. On sounding the bladder a hard stone was found, together with considerable enlargement of the prostate.

The patient was fully prepared for either suprapubic or perineal lithotomy, anaesthetized and placed on the table. I first tried litholapaxy, but even the largest sized lithotrite failed to break the stone as it was both large and hard. I then decided on the perineal operation—in preference to the suprapubic one—as one or two previous cases of suprapubic prostatectomy had died from hæmorrhage and exhaustion, whereas none of my cases of perineal prostatectomy had died.

On perineal incision and exploring the bladder, the enlarged prostate obstructed delivery of the stone. Accordingly the prostate was first enucleated and the stone then extracted. It weighed 4 ozs. Fortunately there was but little hæmorrhage; the bladder was washed out with boric lotion, a drainage tube put in, and the wound packed with gauze. Twenty minims of tinct. opii were given hypodermically the patient kept warm, and given a fluid diet and urotropin, grain 10 t.d.s.

The wound healed slowly, and required touching with caustic lotion for two or three days, but the patient made a complete recovery, and was discharged cured about a month after operation. The recovery of so old a patient in a *mofussil* dispensary with no adequate nursing arrangements, and only two dispensers to help me, was remarkable. He shewed no shock, developed no bed-sores, and escaped hypostatic congestion of the lungs.

A CASE OF COMPLETE AVULSION OF THE SCALP.

By W. L. BROOKES,

MAJOR, I.M.D.,

Civil Surgeon, Northern Shan States, Lashio.

I SEND herewith a photograph of a case of complete avulsion of the scalp which may prove interesting to your readers.

The man concerned was an old Burman of about 60 years of age. He was attending to his sugar-cane mill—the usual type of crude mill worked by bulls yoked to a shaft pivoted on to a heavy wooden mill which is revolved by the bulls moving in a circle round the mill. The old man was bending over the crushing blocks to remove sugar-cane debris when his long hair got undone and was caught in the mill. The bulls continued to move round in a circle which resulted in his hair being wound into the mill. He was dragged round the mill

and fruitlessly tugged to get free. His shouts accelerated the pace of the bulls. At length the scalp gave way and the old man collapsed on the ground. He was found there by others shortly afterwards and brought to hospital in a cart the following day. He was in a low condition suffering from shock and hæmorrhage with high fever, but except for a little oozing here and there, active bleeding had stopped. The raw skull surface was covered with chaff, sugar-cane debris and rubbish from the ground in addition to dried blood clots. It was with difficulty cleansed with hot saline lotion and several bleeding points had to be arrested. Before final dressing several skin grafts were applied, taken from the inner surfaces of the thighs and upper arms of the old man's sons, who were willing donors. Further grafts were applied on two successive days. Injections of anti-tetanic and anti-streptococcus serum were given and the patient was kept more or less under the influence of morphia for a week, during which period he was in pain and had a high temperature.



Except for the areas bared almost to the bone, several of the grafts took. The patient was convalescing satisfactorily but healing was slow, so his relatives removed him to his village before final recovery.

AN INTERESTING CASE OF NARCOTIC POISONING AND RECOVERY.

By R. SUNDARA RAJAN, M.B., B.S.,

Raja Street, Coimbatore.

ON August 27th, 1925, a man named Rama Naickan, aged 49, belonging to the agricultural class, took a quantity of the roots of the blue variety of *Clitoria ternatea*—(Tamil—*kakkanangodi*; Malayalam—*sangupushpam*; Hindi and Bengali—*aparajita*; Kanarese—*vish-*

mugranti) ground well, and mixed into an emulsion with coconut milk. He took this on the advice of a local *vaidyan* as a purgative. He was also advised to take some curd and rice after he had two or three motions. This the patient neglected to do. He had during the day 5 or 6 motions and about a similar number of attacks of vomiting. The patient gradually lost strength and consciousness, till at 6 p.m. he became completely prostrated and unconscious. His body had become quite cold and he became deaf to all calls. I was called to see the patient at 8-30 p.m. and I found him in a state somewhat similar to that of one in a condition of cerebral irritation. He was extremely irritable, was lying on one side, breathing stertorously, his eyes half closed, saliva running down his cheeks and he now and then spat on the ground about him. His legs were stretched out and were kept rigid. His pulse was feeble and slow, about 50 per minute. His heart sounds were not well heard. When I saw him he was already warmed externally with hot ash, but his temperature at the axilla was 96°F. I gave him stimulant injections and a hot coffee enema. I also ordered an enema of thin broth in the course of the night.

During the whole of the next day the patient was still unconscious, and I repeated the injections and enemata. A peculiar feature in his case was that in whatever state of unconsciousness, he would get up from his bed and walk a few steps to pass urine. He passed urine rather frequently every two hours. Attempts at feeding by the mouth were unsuccessful until the evening of the next day when he took a few spoonfuls of milk. He passed no motions after I was called to see him. At about 8 p.m. next day, I gave him an injection of digitalin as I thought the heart was still rather weak, and at about midnight he recovered and began to talk, after nearly thirty hours of unconsciousness.

I wish to bring this case to notice on account of two salient features viz.—(1) the unconsciousness attended with extreme irritability, with retention of visceral reflexes such as that of micturition; and (2) during the stage of convalescence, for a period of more than a fortnight, the patient exhibited a peculiar loss of memory for some recent events which happened prior to his attack. Also he was unable to say how he took the drug or how many motions he had had and so on. Gradually he got over his mental condition and was all right in a month's time.

The root of *Clitoria ternatea* is very commonly given by *vaidyans* in India as a powerful cathartic. Watts' *Dictionary of Economic Products* gives us a detailed account of the drug and its various medicinal properties. The root is a powerful diuretic, as is also exemplified in this case. There are two chief

varieties of the plant, the white-flowered and blue-flowered, the former being the commonly used plant. The patient, as mentioned at the outset, took the roots of the latter variety. It would be interesting to know whether any cases of poisoning by this drug have been recorded and whether the symptoms in my report are in any way peculiar.

A CASE OF FIBRO-CYSTIC TUMOUR OF THE UTERUS. HYSTERECTOMY.

By ERNEST F. NEVE, M.D., C.M., F.R.C.S.E.,

Senior Surgeon, Kashmir Mission Hospital.

ZERA, act, 26, was admitted on October 26th 1925, with a history of abdominal swelling for some months; married, nulliparous. The history of menstruation was regular, but with painful periods associated with constipation. On physical examination an oval swelling was evident, the size of a large coconut, centrally situated, projecting half-way to the umbilicus and fluctuating on palpation. The cervix uteri was long and pointed. The uterus could not be differentiated from the tumour. There were no enlarged glands palpable. The diagnosis lay between a cystic ovarian tumour and uterine fibroid.

On November 2nd, on operating, I found a large cystic tumour exactly like an ovarian cyst. On passing a large trocar and cannula, about two pints of chocolate-coloured fluid were evacuated, closely resembling the contents of an ordinary ovarian cyst. I found, however, that the tumour had developed from the posterior wall of the uterus, so did a supra-cervical hysterectomy, saving both ovaries. The patient made an uneventful recovery and was discharged cured on November 17th.

The tumour was surrounded by a definite and vascular capsule. The fluid contained Foulé's cells. The walls of the cyst, which was monolocular, shewed patches of yellow, partly organised, lymph. On section, the substance of the walls was chiefly fibrous tissue with islands of uterine muscle. It seems probable that, originally a fibroid tumour, the centre of the mass had degenerated and had formed a cavity in which fluid accumulated, and the mass expanded under pressure, forming a fibro-cystic tumour. The cells in the fluid contents were rather suggestive of malignancy, but the walls of the tumour itself did not present any characteristic malignant structure.

Remarks.—One of the chief points of interest in this case is the question of diagnosis. In this patient, pregnancy could be excluded. But it was not so easy to be certain that it was not an ovarian cyst. Everything pointed to its being an ovarian cyst except the fact that the uterus could not be differentiated

from the tumour. Even so, the cystic character was puzzling, owing to the rarity of this type of degeneration.

A CASE OF NIGHT-BLINDNESS DUE TO *ASCARIS LUMBRICOIDES* INFECTION.

By A. R. HARIGOPAL, L.C.P. & S.,

Assistant Medical Officer, Civil Hospital, Nampalli, Hyderabad, Deccan.

HAFIZ, son of Shaikh Imam, a young Mahomedan boy aged 6 years, was brought to the out-patient department with a history of night-blindness of some duration. He had had a similar attack six months previously. Blindness used to come on directly after sunset each evening, whilst if he left a brightly lighted room for a darker passage, he had to grope his way.

There was no history of any serious illness, and no evidence of hereditary syphilis. He looked healthy, but had a very protuberant abdomen. On ophthalmoscopic examination both eyes appeared to be normal. The urine showed no albumin. The spleen and liver were not enlarged.

There was a history, however, of his having passed worms, and of grinding of the teeth during sleep and of convulsions at the age of 2 years. Accordingly santonin and calomel were given, followed by castor oil. A large number of round-worms were passed, after which the night-blindness cleared up completely.

During the past two years I have seen other similar cases where treatment for *Ascaris* infection has cured a condition of night-blindness.

A CASE OF EMBOLISM OF THE SPINAL CORD.

By M. P. CHACKO, L.M.S.,

Assistant Surgeon, Medical Officer, Lalom, Pala P. O., Travancore.

In infective endocarditis embolism of various arteries and infarcts are common, but embolism of the vessels of the spinal cord appears to be a rare phenomenon. Further, embolism of the vessels of the spinal cord due to an embolus from an infected wound appears to be exceedingly rare. Hence the following case is of interest.

Thommen, aged 35 years, ryot, was admitted to the Lalom Hospital on 15-8-1925, with a history of complete paralysis of the lower limbs of 15 days' duration. He had extensive varicose veins of the left leg for which he was advised by a quack doctor to apply leeches. He applied three leeches to the varicose veins, but the blood oozed from the wound for three days together. He applied certain remedies to stop the bleeding, with success. That night at 10 p.m. he went out as usual to pass urine. On rising he felt a loss of power in the limbs

as if something had given way beneath him and he dragged himself with difficulty to his bed. Hot applications were made to his extremities without success. Since then he is bed-ridden and has incontinence.

On admission he had complete loss of sensation and motor power in the lower extremities and anaesthesia below the level of the umbilicus. He had incontinence of urine and faeces and cystitis. He also had burns of the third degree on the dorsum of the feet, which occurred as the result of local application of heat by his too zealous relations.

On examination his heart was normal. He had no history of rheumatism or syphilis. On the dorsum of both feet there was a large burn of the third degree, quite painless and sloughing. There was absolute loss of power and sensation from the costal margin downwards. There were no zones of hyperaesthesia. Neither superficial nor deep reflexes could be elicited in the lower limbs. The bladder was distended. The urine drawn off by catheter was ammoniacal and contained albumin and pus. There was incontinence of urine and faeces. The pulse was 84, regular and of normal tension. The spleen and liver were not palpable.

Despite irregular pyrexia, his general condition slightly improved but the paralysis was unchanged. As he wanted to return home, he was discharged on 23-8-1925.

It may be reasonably inferred that the patient had one or more emboli lodged in the spinal vessels. Charters Symonds (1) states that it is in cases of mild phlebitis that the detached blood clot is formed. The emboli coming from the inflamed varicose vein rapidly produced softening over an area greater than that supplied by the plugged vessel. This explains the ingravescent nature and the completeness of the paraplegia. The infected embolus sets up an acute myelitis. Softening of a definite portion of white or grey matter may also in certain cases be caused by depriving it of its blood supply by the injection of artificial emboli and the resulting degeneration may be studied. For instance, fine particles like lycopodium spores are injected into the abdominal aorta between the origins of the renal and inferior mesenteric arteries. They are prevented by clamps from entering those vessels and passing through the lumbar arteries stick to the branches of the anterior spinal artery and cause softening, mainly of the grey matter of the lumbar portion of the cord.

Corrigendum.

In connection with Assistant Surgeon Romendra K. Basu's account on p. 24 of our issue for January 1926, of a case of very severe abdominal injury successfully treated by operation, in the second last line of the page for "was discharged cured," please read "was discharged cured after two months in hospital."—EDITOR, I.M.G.

Indian Medical Gazette.

MARCH.

SOME IMPRESSIONS OF JAPAN.

THERE is a fatal tendency for globe trotters to form opinions on insufficient data and as my impressions of Japan were formed during a brief stay of about three weeks, their value is limited by the circumstances under which they were formed.

For many years Japan has appealed to the imagination of the people of the West, not only to those who belong to the literary and artistic sections but also to the masses.

Japan is regarded as a land of romance and if the Japanese complain of being misunderstood, it is because they have been idealised and have been regarded as heroes and artists rather than as men of affairs. The Japanese themselves are under no illusions, they know only too well that their country has its hard problems of every-day life and they are setting about the solution of these problems in an earnest and business-like manner. They rather resent the atmosphere of unreality which has been introduced into descriptions of themselves and their country, and though they feel that they cannot convey to the foreigner true and unbiassed opinions about Japan, yet they are acutely conscious of the false impressions that exist.

To the medical man Japan offers materials for study which are of great interest; the introduction of scientific medicine into Japan took place in much the same way as the introduction of modern methods of business, warfare and science. In ancient times much of the indigenous medicine of Japan was of Chinese origin and tradition held an undisputed sway. The teaching of anatomy was based, not on dissection of the human body, but on books and pictures whose accuracy was accepted without question.

When the western books of anatomy found their way into Japan it was at once noticed that the descriptions of the human frame which were contained in them did not agree with those which were found in the Japanese books. The first explanation which was offered by the followers of the indigenous system was that the structure of the foreign barbarian would naturally be quite different from that of the Japanese, who are descendants of the gods. This view was not accepted by the younger generation which had already learned

the great lesson of science "do not argue or theorize, but examine for yourselves." When the great step of dissecting the human body was taken, it was found that the bodies of the Japanese were exactly similar to those of Europeans as described by western anatomists. With characteristic honesty the Japanese at once became converted to the methods of observation and experiment, and though quackery still prevails in Japan, as it does in every other country, all educated Japan is solid for scientific medicine. Germany may be described as the spiritual home of Japanese modern medicine and Koch has exercised a greater influence on Japanese medical thought and work than any other man. Bacteriology and laboratory methods occupy a predominating position and nearly all the Japanese medical scientists whose names are known throughout the world are bacteriologists or laboratory workers. The laboratories of Japan are numerous and well equipped and thousands of young men are eagerly engaged in experimental work; the clinicians find themselves in a position of relative unimportance and the wards are usually the least satisfactory parts of the hospitals. There is no movement towards resuscitation of the obsolete indigenous system of medicine, such as is seen in India; modern science is pursued with as great eagerness as in any other country in the world.

Medical scientists occupy a high position in the social and official world of Japan; Baron Kitasato is an honoured member of the House of Peers and it is common for men belonging to the highest families in the land to adopt medicine as a calling. In Japan as in Germany it is not considered derogatory for medical scientists to co-operate in the commercial side of medicine; some of the leading research institutes are said to make a large income from the sale of vaccines and sera and the laboratory worker appears to have better prospects of a lucrative career than the physician or surgeon. This, however, can hardly be a full explanation of the enthusiasm with which so many young men take up research work, there is evidence of a strongly developed spirit of scientific curiosity and of a desire to achieve experience in scientific work. It is remarkable that a country which has so recently adopted science should already have produced so many men whose names are honoured in bacteriology and pharmacology, and although Kitasato drew his inspiration from Koch and Hata from Ehrlich there is now a well established Japanese school of medical investigation. The handicaps under which the Japanese students work should not be forgotten; one of the leading business men of Osaka assured me that the difficulty of the Japanese language was such that it involved a wastage of about three years of the average student's life as compared with the time that is occupied by western students in acquiring a mastery of their own language.

The necessity for the laborious study of at least one European language is an added handicap which is greater than that of the Indian student who learns English, and is far greater than that of the European student who acquires another modern language. The Japanese have no special aptitude for languages and so our admiration is unbounded for those who acquire a good working knowledge of English and German as well as of their own very difficult language. English is compulsory in the higher schools, but the time is yet distant when the knowledge of English will be as universal among educated Japanese as it is among educated Indians.

Considering the reputation of the Japanese for meticulous accuracy, it is surprising to find that a low standard of correctness in spelling and grammar exists; English school books, readers, dictionaries and advertisements are full of mistakes which could have been avoided by enlisting the help of a foreigner or even of a highly educated Japanese. Some Japanese-managed newspapers are published in English; in these mistakes are few unless one considers it a mistake to adopt Americanisms in a lavish manner. American influences are far stronger than English in commerce and in games and the Tokio press reports of baseball matches would do credit to a Chicago evening paper.

Japan is engaged in a strenuous effort to deal with her great medical problems on scientific lines, she has earned the admiration and sympathy of the whole world, their help she is too proud and too self-reliant to crave. Japan has deliberately broken with her past and has started on the path of modern progress. Only one doubt persistently creeps in, how will she deal with the problem of population and food supply? Increased production and improved physical efficiency are the methods which are being relied on and it is reasonable to hope that these will suffice for a time. The average age of men on marriage has advanced by a few years and is still slowly advancing, but the Japanese refuse to contemplate for an instant the adoption of a policy of restriction of the population. If the present rate of increase is maintained the critical period cannot be staved off indefinitely, but the problem is one which the Japanese hardly discuss among themselves, still less are they prepared to discuss it with outsiders. Their problems of disease on the other hand are discussed with absolute frankness; tuberculosis is the greatest scourge in Japan, just as it is in the other countries of the East: venereal disease is exceedingly common in spite of the elaborate methods of official inspection of the licensed prostitutes of whom there are more than three hundred and fifty thousand; beriberi appears to be on the increase and although it does not rank high as a cause of death it is

certainly one of the great factors in producing disablement and loss of physical efficiency.

The medical men who, like myself were the guests of the Japanese Government at the Sixth Congress of the Far Eastern Association of Tropical Medicine in October last, were unstinted in their admiration of the marvellous capacity for organisation and of the unbounded hospitality which they received wherever they went. The Seventh Congress of the Association will be held in India in 1927; we cannot for a moment expect to maintain the high standard of hospitality which was set by Japan. India will have to make a great effort to avoid the "odious comparisons" which will inevitably be made if the foreign delegates find that their treatment is in marked contrast with what they received in Japan and the other countries in which the Congress has previously been held.

There should be no difficulty in making the scientific side of the next Congress a success, the number of papers will probably be much less than at Tokio, but for that very reason there should be greater opportunities of discussion, and for learning from the foreign delegates who will attend.

Japan is an ideal country for a brief holiday, and the visitor who goes there in quest of recreation or for the study of art will not be disappointed. One piece of advice will be found useful by the foreigner, he will be well advised to mind his own business and to avoid the patronizing attitude which some visitors affect. The Japanese are both proud and sensitive, they regard it as their own duty to deal with the problems which confront them and they resent the gratuitous advice of the foreigner, however well meant it may be. Nobody can complain of their adoption of this attitude, the Japanese themselves are strictly correct towards the people of the countries which they visit, they ask numberless questions and seek for information with great diligence but they do not meddle in the internal affairs of other countries. We hope that Japan and other countries of the East will be well represented in the next congress of the Far Eastern Association of Tropical Medicine, but we must ask the delegates to be indulgent towards the efforts of India to entertain them. They will receive a warm welcome and for the sake of the good name of India it is to be hoped that they will not have reason to complain of the hospitality which will be extended to them. The Government of India doubtless realise that a great effort lies before them if the seventh congress is to be a success, but it is necessary also that the Local Governments and the medical profession of the places which will be visited should bestir themselves to give their guests a pleasant and profitable time during their visit to India.

J. W. D. M.

Current Topics.

Report on the Student Welfare Scheme for the year 1924. (Health Examination of College Students of the University of Calcutta.)

THIS year's report covers the examination of 9,056 students, examined up to 31st December 1924. The percentage of Hindu students is as high as 85, while that of the Mahomedans is 7 only though Mahomedans constitute 53.55 per cent. of the population of Bengal.

Among the Hindus, the Brahmins, Kayasthas and Baidyas described in the Census as the *bhadralog* classes claim 66.5 per cent. of students. About 7.5 per cent. show good muscular development and 27.5 per cent. are of thin build. The remainder are described as stout or medium.

This year's record shows a fall of about 6 per cent. in the number of students having defective skins. Under defective skins are included all sorts of skin diseases. Acne and scabies are the most common forms of skin troubles. Nearly one-third of all the students suffer from some form of skin-disease.

The following table shows height and weight according to age.

Age.	16	17	18	19	20	21	22	23	24	25	26	General.
Height in c.m. ..	163.89	164.82	166.33	166.2	166.34	167.35	166.9	165.8	166.25	165.53	166.6	166.35
Weight in kilo ..	47.67	49.42	50.54	51.03	52.59	52.28	52.16	52.47	53.56	54.05	52.08	50.9

Table 12 shows the average chest measurements and "vital capacity."

	Inspiration c.m.	Expiration c.m.	Expansion c.m.	Vital Capacity lit.
Average ..	82.71	78.63	4.11	2.69

Head Measurements.

TABLE No. 15.

	Circumference. c.m.	Cephalic Index.
General	53.35	80.05

TABLE No. 16.

Cephalic Index according to Age.

16	17	18	19	20	21	22	23	24	25	26
80.96	80.6	80.3	79.99	79.87	79.61	79.24	78.95	77.71	78.64	77.96

No less than 33 per cent. of the students have defective eyesight. Of these 50.29 are uncorrected and

18.05 are partially corrected. There is a considerable increase in the deterioration of vision with advancing age.

Teeth.

Percentage figures.

Normal. Caries. Defective.

Averages .. 63.36 7.74 30.15

Gums.

Spongy gum. Pyorrhoea.

Averages .. 19.70 4.44

Percentage of General Defects.

	Heart.	Lung	Liver.	Spleen.	Tonsil.	Hydrocele	Orchitis.	Hernia.
Averages ..	5.25	.53	.75	2.34	10.93	.89	1.01	.15

Fifty-Five Years of Progress in Surgery.

By Sir ARTHUR MAYO-ROBSON, K.B.E., C.B., C.V.O., D.S.C., F.R.C.S.,

Emeritus Professor of Surgery in Leeds University, and Consulting Surgeon to the Leeds General Infirmary.

British Med. Jour., October 10, 1925.

I FEEL it a great honour to have been asked to give the opening address of the Medical Department of the Leeds University.

To-day is the fifty-fifth anniversary of my entering as a student, and, with short intervals for post-graduate study at home and abroad, it was my privilege to be attached, in one capacity or another, to my Alma Mater for over thirty years before making London my centre. I had the good fortune to begin my life's work in 1870, when there was great advantage in witnessing and taking part in the old order of things and being able at once to appreciate and participate in the reformation that came within the next few years of seeing the birth and growth of the science of bacteriology, the key that unlocked the way to the knowledge of the cause of so many diseases, of taking part in the infancy, the adolescence, and the sturdy manhood of its brilliant offspring antiseptic and aseptic surgery and of having the honour of making a personal acquaintance with, and of being an ardent disciple of, those two great masters—Pasteur and Lister. To those of my audience who are entering on their medical studies to-day, and to any other students who have not read them, let me recommend two books, which will not only give you the greatest pleasure to read and carefully study, but

which will stimulate you in your careers and afford you great examples to live up to. They are: (1) *The Life of Pasteur*, by his son-in-law, René Vallery-Radot, which I read when first published in the original, but which I have read a second time, with equal interest, in a very good translation by Mrs. R. L. Devonshire, with an excellent introduction by my late distinguished friend Professor Osler. (2) *The Life of Lord Lister* by his nephew, the late Sir Rickman Godlee, for some time a colleague of mine on the Council of the Royal College of Surgeons, and later President, who was himself a distinguished surgeon.

In the early seventies, it was possible to see hospitals ravaged with hospital gangrene, septicæmia, and pyæmia; when any operation however simple, might, and frequently did, assume complications of the most serious import, often ending in death. For instance, I actually saw death follow the simple tapping of a hydrocele by an eminent surgeon. Secondary hæmorrhage was of frequent occurrence, and it was usually considered advisable to have tourniquets at hand or even around limbs, ready for the attendants to tighten up when the silk ligatures were due to separate. Ordinary compound fractures often ended in loss of life or limb or took weeks or months to heal, and not infrequently ended in shortened or crippled limbs. Erysipelas, pyæmia, septicæmia, and tetanus were never long absent from surgical wards. Erysipelas was explained by change of weather, tetanus by nerve irritation, tubercle by a diathesis, and rapid deaths from septicæmia by shock. Abdominal diseases were treated expectantly, practically always; and if we refer to the hospital reports of the very few cases operated on in the large London and provincial hospitals, we shall see that it was a wise provision that such cases were handed over to the physicians by universal consent. They considered the adoption of palliative measures and the making of a diagnosis quite adequate, until Nature relieved the victims and enabled a confirmation or otherwise of their surmises to be made on the *post-mortem* table.

Soon after receiving my qualification in 1874, I was asked by a medical man if I would go to Glasgow to be present at an operation—amputation of the thigh for senile gangrene—about to be performed on a relation of his, by a general practitioner. The doctors arrived with two large stone bottles of whisky, which was poured into several washhand basins. Into one were placed the instruments and silk ligatures, into another sponges, and into another dressings, while another served for soaking the hands of the surgeon and washing the patient's thigh at the line of amputation. The limb was amputated expeditiously and well; the vessels were ligatured with fine silk, the ligatures being cut short; the face of the stump was well sponged with pure whisky and the flaps were sutured, the stump being closed without drainage. Fine towels, wet with whisky, were placed over the stump so as to make a complete and well padded dressing, which was then bandaged on and supported by a short splint. The patient made a complete recovery, and the wound healed by first intention.

Thus I saw my first perfect aseptic—or should it be called antiseptic?—major operation, which made a great impression on my mind and served me as an example for many subsequent successes.

Although between 1867 and 1869, 34 out of 40 amputations had survived in Lister's wards, his isolated voice was not attended to, and not even his celebrated lecture in 1870 on "The utility of antiseptics applied to surgical practice" received the attention it demanded. It is sad to think of the thousands of young men who perished in the ambulances and hospitals of France in 1870 and 1871, who might have been saved by Lister's method. But the heads of the profession in France took no interest in the rumours of the success being attained by antiseptic methods; and even in his own country Lister's method was violently criticized and turned down. This opposition continued year after year to my knowledge, and even pursued Lister when he was appointed surgeon

to King's College, London, where some of his colleagues on the staff were his bitterest opponents. As an ardent disciple, I had the advantage of following his work, as to the value of which I had had no doubt from the time I began my surgical studies and became acquainted with the doctrines of Pasteur and Lister.

Even in the early eighties, when I had the honour to be appointed honorary surgeon to the Leeds General Infirmary, my distinguished predecessor handed me with pride and with some ceremony his operating coat, which he was still using, and which he had used for years; it was covered with innumerable spots of old clotted blood. I began my work by wearing washable garments frequently changed, and when requesting the same for my assistants and nurses the question of laundry expenses was raised. At a later stage, when initiating the wearing at all my operations of boiled rubber gloves, on the advent of aseptic in place of antiseptic surgery, the complaint of extravagance was even more strongly urged, and was only settled, as time wore on, by the results, which compelled their general adoption.

On taking up my appointment on the staff of the infirmary, abdominal surgery was practically confined to ovariectomy, of which the mortality was 26.6 per cent.

At first, using antiseptics as advocated by Lister (which, although they kill the germs, at the same time damage the tissues), I became more and more impressed with the value of asepsis, or absolute cleanliness, which avoids the introduction into wounds of any germs, thus rendering the use of strong poisons, such as carbolic acid, unnecessary. Metchnikoff's researches, which showed the phagocytic power of the white corpuscles in wounds, enabled the presence of the very few organisms in the air to be ignored, if every care was taken by the surgeon not to introduce any by hands, instruments, sponges, or dressings.

In 1889 I published a list of all my abdominal operations from the time of beginning my work in the infirmary. This paper was read at the meeting of the British Medical Association in Leeds in August, 1889.

There were 61 ovariectomies with only two deaths, equal to 3.2 per cent.; 12 cases of cholecystotomy for gall stones and 1 of cholecystenterostomy without a death; 28 cases of radical cure of hernia, 6 cases of pelvic abscess, 5 cases of tuberculous peritonitis, and 2 cases of hydatid cyst of liver, all without a death; 30 cases of strangulated hernia with 5 deaths, all from gangrene or rupture of the intestine, but none from wound complications; 14 cases of operation for myoma of uterus, including hysterectomy, with 3 deaths; and 15 operations for malignant disease too extensive for removal, and cases of general peritonitis from ruptured viscera, with 9 deaths.

This list serves to illustrate the great advances that had been made in abdominal surgery up to 1889.

On June 21st, 1884, I performed my first operation for gall stones, and began to devote special attention to diseases of the gall bladder and bile ducts. After an experience of nearly 200 operations for gall stones, in the absence of malignant disease, profound jaundice, or infective cholangitis, with the loss of only a single patient, and even if the complications above mentioned be included, with a mortality of only 2.7 per cent., I decided to give my experience in book form, under the title of *Diseases of the Gall Bladder and Bile Duct*, including gall stones, which was published in June, 1897.

The surgery of the stomach, pylorus, and duodenum next formed a very interesting and new field of work, in a class of cases treated before the reformation of surgery entirely by the physician, with only moderate and usually temporary relief. The success of surgical treatment, which enabled the stomach to be accurately examined in the living subject, added enormously to our knowledge of the pathology, and enabled us to put in practice a number of new operations or more efficient modifications of older ones. After an experience of over 200 gastric operations, I was again elected Hunterian Professor at the Royal College of Surgeons in 1900, and took as my subject for the lectures *Diseases of the*

Stomach and their Surgical Treatment. As no work on gastric surgery had been published, and as much new and original material had accumulated for the purpose, I decided to write a work having the same title as the Hunterian Lectures, on which in fact it was based. I was fortunate in securing the help and collaboration of my colleague and former house-surgeon, Mr. Berkeley Moynihan, now your distinguished Professor of Surgery, Sir Berkeley Moynihan, Bt., whose brilliant career has been a source of great pride to us all, and to me especially, since we were intimately associated when he was appointed assistant surgeon to the infirmary. Our first edition was published in 1901, and a second edition in June, 1904, when we were able to report an experience of 218 posterior gastro-enterostomies in simple diseases of the stomach, with a mortality of 3.2 per cent., a great contrast with the year 1885, when the mortality from all sources was 65.71 per cent., whereas in 1890 it was 47 per cent. and in 1900 35.4 per cent.

After the accumulation of considerable experience in operations on the pancreas, I had the honour in 1904 of being appointed for the third time Hunterian Professor at the Royal College of Surgeons, taking as the subject of my lectures "The pathology and surgery of certain diseases of the pancreas." These were subsequently published, along with numerous additions, in a work entitled *Diseases of the Pancreas and their Surgical Treatment*, in which I again had the collaboration of my colleague Mr. Berkeley Moynihan. During the whole time of my work on the pancreas I had had the valuable help, in various chemical and pathological questions constantly arising, of my friend Dr. P. J. Cammidge; in 1907 we published a work together, dealing largely with the pathology of the pancreas.

My first of many hundred operations for appendicitis was on June 8th, 1891, and to mark the progress and success of surgical treatment it is only necessary to refer to the infirmary reports for 1885 and 1925; in the former appendicitis is not even mentioned, whereas in the latter 788 operations are recorded, with a mortality of only 3 per cent. Of intestinal surgery there was mentioned only one operation in 1870, whereas in 1925 there were 180. Of renal and ureteral surgery there is no recorded case in 1870, but 85 operations are reported in 1925.

In 1874, when attending a course of lectures on mental diseases at the Wakefield Asylum, given by Dr. (now Sir) James Crichton-Browne, I had the privilege of witnessing demonstrations on the localization of the functions of the brain, given by Dr. (now my distinguished friend Sir) David Ferrier, whose remarkable discoveries, along with those of Dr. Hughlings Jackson, rendered possible the subsequent brilliant work of the late lamented Sir Victor Horsley, who gave his life for his country in the great war.

The descriptions of the evacuation of localized abscesses of the brain, of the treatment of Jacksonian epilepsy, of the removal of cerebral tumours, of the extraction of bullets and other foreign bodies, and of many other operations, would sound like a romance did time permit of a description.

Fractures.

The treatment of simple fractures, some by wiring the bones, from the first cases of fracture of the patella wired by Lister to the more frequent wiring of other bones by my friend Sir Arbuthnot Lane, and the innumerable cases of compound fracture, especially of the femur, treated by Thomas's splints and other special appliances, and with an infinite care in dressings, have completely revolutionized this branch of surgery, leading to the saving, during the war, of many thousands of lives and limbs that must otherwise have been lost.

The enormous amount of valuable orthopaedic work done during and after the war in the various war hospitals, chiefly under the direction of that master of orthopaedic surgery, Sir Robert Jones, has resulted in a great saving of deformities among wounded soldiers. The importance of orthopaedics in civil life is shown

by the valuable work of the orthopaedic department in the Leeds Infirmary, in which no fewer than 910 operations are recorded in 1924.

Surgery of the Prostate.

The operation of prostatectomy initiated and carried to perfection (as shown by specimens in the museum of this Medical School) by my late colleague and friend, Arthur Fergusson McGill, one of the surgeons to the infirmary, whom to know was to love, has been of infinite service in prolonging life and adding to the comfort of thousands of elderly men, the remainder of whose lives would otherwise have been one of torment and sorrow. Had that great surgeon been spared to work for a few more years, I feel sure that his skill as a surgeon and his original and fertile mind would have been of still greater service to the profession and to mankind generally. It seemed to some of us very hard that the reward of his labours should have fallen to others; but fortunately the operation was taken up later, where he left it, by the late Sir Peter Freyer, in whose able hands it was carried out so successfully that in 1912 he reported in the *British Medical Journal* 1,000 operations of complete prostatectomy.

In bone injuries and diseases; in the discovery of calculi in the kidneys and ureters as well as in the pancreas and bile passages; in the localization of foreign bodies in the heart, the lungs, the œsophagus, the stomach, the intestines, and in various parts of the body; in the diagnosis of diseases of the stomach and intestines by observing the passage of bismuth test meals; in observing the size and pulsations of the heart, and in many other ways, both for diagnosis and treatment there is now in every well equipped hospital an x-ray department, in which much valuable work is being carried out by experts in this new branch of medical practice.

Pasteur's Influence on Medicine.

The influence of Pasteur's work in medicine has been no less than Lister's work in surgery; for the germ theory of disease has led to a knowledge of the causes of the various infective and many other diseases, and by means of vaccination or protective inoculations to the prevention or relief or cure of many of them; for instance, tetanus, diphtheria, typhoid fever, cholera, splenic fever, malignant pustule, hydrophobia, staphylococcal diseases, such as boils, carbuncle, osteomyelitis, and acne; and some of the streptococcal infections. In the war many thousands of lives were saved by the preventive injections of antityphoid vaccine, with which we were all inoculated before going out to the front, and by the injection of antitetanic serum into every wounded soldier on the battlefield before reaching the casualty clearing station.

In obstetric medicine the influence of Pasteur's teaching, and his bold exposure of the carrying of puerperal infection by the direct conveyance of germs through dirty hands, instruments, and dressings of those attending the lying-in woman, brought about such a change in the death rate as to appear almost miraculous. The saving of life has been almost as great as that brought about by the antiseptic system in surgery. Puerperal fever, that terror of the lying-in woman, has been practically abolished. For instance, in the maternity department of the Leeds Infirmary during 1900 there were 547 women delivered without a single maternal death.

Of Pasteur's many other discoveries and victories there is no time to speak, but I ask my audience, Was there ever such a benefactor, not only to his country, but to humanity in general and to the world at large? His life rings with the spirit of service.

Conclusion.

In the time at my disposal I have tried to show the immense progress that has taken place in surgery during the past half-century. I have also tried to show what a close connexion exists between the science and art of our profession, and how very necessary it is, if we are

to continue our march of progress, that experimental research should not only be untrammelled by factious and unreasoning opposition, but that it should receive greater recognition, encouragement, and support at the hands of the public. An even closer alliance between the physician, the surgeon, the pathologist, the bacteriologist, and the physicist is desirable, as the time is coming when preventive measures, some of which I have portrayed, will save much operative work, and when it will be thought a greater triumph to prevent than to cure disease.

It is quite evident that methods which were considered sufficient years ago are totally inadequate to-day. We may modify but we cannot prevent the world's advance; and while times change men change with them. The medical profession is imbued with a spirit that half a century ago was undreamed of. Not only have apparently insurmountable difficulties been overcome, but habits of thought have been attained which have made such achievements possible, and a scientific attitude of mind has become characteristic of our profession, as it has of the leaders in every branch of the world's progress.

Acute Intestinal Obstruction.

British Med. Jour., November 28, 1925, p. 993.

At a British Medical Association meeting the discussion was opened by Sir William Taylor, Regius Professor of Surgery, Dublin University.

The mortality attending the treatment of this condition is not one whit better to-day than it was at the beginning of the century. This appalling state of affairs is solely due to carelessness of the general practitioners or physicians who see these unfortunate cases in the earlier stages of their illness. Instead of recognizing that purgation and enemas can do no good, but on the other hand, may do an infinity of harm, these practitioners are continually laying themselves open to an action at law for malpractice.

The mortality attending the surgical treatment of primary acute intestinal obstruction, the result of intra-abdominal conditions is nearer to 60 per cent. than the 35 to 40 per cent. usually stated—a truly shocking state of affairs.

Apart from acute intussusception, three stages can be recognized in these cases, and the treatment must necessarily vary according to the stage in which one finds the patient.

The first stage is that in which the patient is seen early (within twenty-four hours). His general condition is good and there is but little intestinal distension. The second stage is that in which the patient is not seen until later—two, three or four days. His general condition is good, but there is considerable intestinal distension and severe vomiting which may or may not be stercoraceous. The third stage is that in which the general condition of the patient is bad. His pulse is feeble and perhaps intermittent, and vomiting is almost continuous and is certainly stercoraceous.

The treatment of the first stage consists in washing out the stomach with sodium bicarbonate solution. A general anæsthetic is administered and the abdomen is freely opened. The cause of the obstruction is searched for and removed, after which the abdomen is closed. The stomach is again washed out and the patient returned to bed. Lavage of the stomach after operation is more important, in many cases, than it is before the operation.

In the second stage a similar procedure is adopted until the obstruction is discovered and removed. A separate incision should then be made through the left rectus muscle above the umbilicus, and a loop of the jejunum, as close to its origin as possible, is brought out through the wound. Into it is fastened a tube of 7 or 8 mm. diameter, after the method of Senn's gastrostomy, except that only one or two purse-string sutures are used, so that too much subsequent narrowing

of the intestinal lumen may be avoided. The intestine is then returned within the abdomen and fixed with two catgut sutures, one on each side of the tube, to the parietal peritoneum and posterior sheath of the rectus. A lunate piece is cut out of each side of the end of the tube before it is introduced into the intestinal opening, so that if it should accidentally impinge upon the opposite wall of the bowel the intestinal contents could still escape freely. By this procedure the distended intestines will be allowed to empty themselves of their poisonous contents. The central wound is then closed. The stomach is thoroughly irrigated as before, and the patient put back into bed. An experienced nurse or a senior student is directed to continue irrigating the intestines with sodium bicarbonate solution by siphonage through the tube. In this way, without taxing the patient's strength and without producing any shock, the intestines are assisted to empty themselves. This process can be continued for several hours, at the end of which time the entire intestinal area between the stoma into which the tube has been introduced and the point at which the obstruction existed will have been emptied of its contents, and these contents replaced in large measure by a fluid containing sodium bicarbonate and glucose, the absorption of which will counteract the tendency to acidosis and help to build up the reserve carbohydrates as well as replace the fluids of which the tissues have been deprived by the continuous vomiting.

In the majority of these cases the tube can be removed in twenty-four or forty-eight hours under gas or local anæsthesia. Lactose may be given freely either by mouth or through the intestinal tube, as it has been shown that lactose can eliminate proteolytic bacteria from the intestinal flora.

In the third stage the patient is too ill to stand the administration of a general anæsthetic, and he is not even removed from the bed in which he lies. The stomach is washed out as described above, after which the tissues of the abdominal wall above the umbilicus are infiltrated with a $\frac{1}{2}$ per cent. solution of novocain. An incision of $1\frac{1}{2}$ or 2 inches is then made through the middle line or left rectus muscle, as may be desired, into the abdomen. A finger is introduced and a loop of the jejunum, as near to its origin as possible, is withdrawn. A tube is then introduced into this fluid-containing segment of gut as before described, and siphonage similarly continued.

Should the patient survive, it may be possible at the end of a week to open the abdomen, seek out the cause of the obstruction and remove it. In the meantime nourishment can be administered through the tube directly the intestinal contents have been evacuated, or it may be given by mouth. The tube must not be removed until the patient has recovered from the effects of the second operation.

In all cases of intestinal obstruction in which stercoraceous vomiting has occurred, drainage of the jejunum as close to its origin as possible should be instituted. This drainage can be assisted by repeatedly filling up with sodium bicarbonate solution and siphoning off the intestinal contents after the patient has been returned to bed.

The treatment of acute obstruction engrafted upon chronic is somewhat different. The site of the chronic obstruction will almost invariably be found to be somewhere in the large intestine, and in all such cases the bowel above the obstruction should be drained at once. A cræcotomy after the method of Sir Harold Stiles gives the best results so far as tiding the patient over his immediate dangers is concerned. This carries out Bonney's idea of draining the fluid-containing segment.

Of the mechanical conditions producing primary acute intestinal obstruction within the abdomen intussusception is the commonest I have myself encountered. There is no acute abdominal condition more easy to diagnose, and that, too, although the majority of such cases are met with in young infants who are unable to speak. There cannot be any excuse for failure to recognize this condition within from an hour or two to twelve hours

after its onset. The condition is met with most frequently in infants between the ages of 2½ months and 10 or 12 months—my youngest case occurred in an infant of 2½ months. It is occasionally met with (but with diminishing frequency) at all ages up to 70 or more.

The diagnosis of intussusception once made, the only satisfactory method of treatment consists in early operation and reduction by gentle expression from below upwards. Care should be taken to see that the least dimple at the site of commencement of the intussusception is expressed.

Recurrence is rare. Sir William's mortality has been 3 deaths in 81 cases. For some years past he has sent these cases home a few hours after they have recovered from the effects of the anæsthetic. The mother reports daily to the hospital as to the infant's progress or a student visits the case.

This condition requires great gentleness in manipulation and great rapidity in operating. Given an average care of less than twenty-four hours' duration the complete operation should not require more than ten or eleven minutes to perform.

Mr. W. Sampson Handley, Surgeon to the Middlesex Hospital holds that if diagnoses were made and operations were skilfully performed within twenty-four hours of the onset of acute obstruction, it is certain that recovery would ensue in nine cases out of ten. The textbooks are confused and deficient in the information they supply. They usually give a complete list of the signs and symptoms of obstruction, but they make little distinction between the valuable early signs and those which merely mark a lost opportunity. The early signs are few and some are inconstant, the signs of shock and collapse may be entirely lacking if strangulation is absent. There is usually no distension, and the muscle of the abdominal wall is perfectly soft; even pain and vomiting are not invariable signs.

To make an early diagnosis the observer must rely exclusively upon the presence of complete constipation—that is, cessation of the passage of flatus and fæces for a period of twenty-four hours, during which time two turpentine enemas are given.

Secondary paralytic obstruction is sometimes the result of strangulation, and persists after the strangulation is relieved; or is sometimes due to the extension of peritonitis to the muscular coat of the bowel.

There are cases where a loop of bowel has been released from strangulation, and where its condition appears recoverable and resection unnecessary, or forbidden by the patient's age and general condition. Unfortunately in some of these cases, though gangrene of the strangulated loop does not supervene, the loop nevertheless remains paralysed, and the patient dies of obstruction before the affected loop has recovered its peristaltic power.

Mr. Sampson Handley urges the performance of a precautionary lateral anastomosis to short-circuit for the time being the doubtful loop.

The Prevention of Squeezing in Cataract Operations.

DR. F. KUGELBERG of the Swedish Mission Hospital in Tirupatur, has an interesting article on this subject in the *Journal of Medical Missions in India* for November, 1925.

The principle adopted is nerve blocking as suggested by van Lint in 1914 and followed up by Villard and Major Wright of Madras. Dr. Kugelberg now employs a method of nerve blocking in every case. A 2 per cent. solution of novocain is used and to each c.c. one drop of 1 in 1000 adrenalin is added. A 2 c.c. "Record" syringe is fitted with a fine needle of rustless steel (B. & W. No. 213 about 3.5 cm. long). The eye is treated with 5 per cent. cocain to each c.c. of which 4-5 drops of adrenalin solution are added and then the muscles of the forehead and eyelids are thrown out of action by blocking the facial nerve and the nerves of the eyelids in the

manner described by the author. The operation is begun after 20 minutes when the maximum effect is produced. The paper should be read by all eye surgeons.

Röntgen Ray Treatment of Cellulitis and Carbuncles.

DR. FRED M. HODGES of Richmond, United States of America reports in the *Journal of the American Medical Association* of October 24th, 1925 several cases in which great success followed the use of x-rays in the treatment of carbuncles, erysipelas, parotitis and various forms of cellulitis. The technique used in most cases: 4 milli-amperes; 9 inch spark gap; eight minutes; 9 mm. of aluminium; 9 inches distance; half this dose was repeated in four days and several days later when necessary. The area treated included one inch of healthy skin all round at the first sitting; later treatments were directed towards the central lesion.

Race Suicide in Kashmir.

ACCORDING to Dr. Kathleen Vaughan the Hindus of Kashmir are diminishing in numbers at the rate of about 1,000 a year, although they form the ruling and intellectual classes of the country. The reasons given are venereal disease, tuberculosis, osteomalacia and infanticide. It is stated that many "unwanted" infants are strangled or drowned soon after birth.

It is difficult to believe that infanticide should prevail among a notably cultured section of the community in Kashmir.

The Treatment of Tuberculosis in General Practice.

By G. Y. OLIVER, B.A. (Cantab.), M.R.C.S.
The Prescriber, August 1925.

THE greatest problem in the treatment of tuberculosis is undoubtedly early and accurate diagnosis.

One of the most important signs of early tuberculosis is the drop in the blood pressure. A blood pressure below 90 mm. is suspicious.

The most reliable and earliest sign is that of Pottenger, who has shown that inflammatory changes in the lungs give rise to sensitiveness on the areas of skin served by the second cervical to the tenth dorsal nerves. A very fine needle is drawn over the skin in horizontal lines, the patient being asked to say when it feels more tender at one point than another. It is surprising how early the sign appears; it can be obtained even before the temperature starts to rise.

The patient suffering from incipient tuberculosis feels slightly languid; he has no night sweats, no cough, and perhaps a rise of one degree in the evening temperature twice in one week; has a blood pressure of 90 mm. (danger sign) and has also a slight area of superficial tenderness over the apex, either in front or behind, sometimes it may be both back and front. A very few crepitations are found over this area, and on being skiagraphed the diaphragm on the same side as the superficial tenderness lags behind the sound side. These signs are confirmed by injecting Crofton's 'H.T.S.' antigen* under the skin. This is a solution of the entire tubercle bacillus in benzoyl chloride, including the fatty envelope lipoids, and is the most perfect preparation of antigen possible.

Start with the smallest dose first 0.000,000,1; if there is no reaction give 0.000,00,1; if still no reaction give the next in the series 0.000,01. It is extraordinary how some bad cases do not react until one reaches a fairly high dosage, whilst cases which one would have no suspicion of develop an alarming reaction after the first

* Crofton's antigen ("H. T. S." or Human Type Solution) was described in *THE PRESCRIBER*, 1924, Sept. 316. A full account of it may be found in Dr. W. M. Crofton's work, "Pulmonary Tuberculosis" (Churchill, 1917).

injection. The patients take their temperature every two hours during the forty-eight hours following the injection. In some people the reaction seems to be delayed for 36-48 hours.

1. *Local Reaction.*—This may appear as a very faint erythema, or may go on to an acute inflammation, which may even spread all over the arm. In nearly all these cases one notices a hard lump at the site of the injection, which may be from the size of a pea to that of a horse-chestnut. These hard nodular swellings persist for nine or ten months; in consequence of this it is advisable to inject in a different part of the body each time, and if the lesion is only one-sided, it is important to avoid the arm of that side altogether.

2. *General Reaction.*—This is simply a feeling of malaise, with rise of temperature and pulse rate. The patient must be advised to go to bed when the temperature is over 100° and to stay there until it comes down.

3. *Focal Reaction.*—This reaction is very interesting to watch, and the rule holds good that whenever there is even a very slight general reaction there will also be a focal reaction in some part of the body.

In cases which give a positive reaction with Crofton's antigen, it is best to get the sputum examined to see if there is a mixed infection. If this is the case, an autogenous vaccine should be prepared and given first until the sputum contains only tubercle bacilli. In the very early cases the infection appears to be true tubercle and no other organisms are present. If the reaction is very severe, the safest plan is to wait seven days and then give the same dose again and continue to do this until the reaction is slight. The rule always should be to make haste slowly; if in the least doubt, repeat the same dose rather than give the next in the series; also great care must be exercised on changing from one dilution to the next.

Marked improvement in weight, blood pressure, and temperature is seen in all cases treated with Crofton's antigen.

The antigen appears to effect a lasting cure, as patients, six months after treatment is finished, still retain a normal blood pressure of 120 mm.

As far as one can see, all conditions of tuberculosis can be cured with this antigen, but it is quite impossible to replace the lung tissue which has been destroyed, and it is advisable to point out in advanced cases that patients must govern their activity in accordance with their lung capacity and must remember that instead of two lungs they may possibly have only one.

The Causation and Prevention of Rickets.

By A. WEBSTER and LEONARD HILL.

British Medical Journal, May 23, 1925, p. 956.

THIS very important paper gives a useful summary of modern work on rickets and contains a record of further valuable experiments. We give some of the more important facts recorded in the paper.

Rickets is so frequently found in the large cities of America and Europe that it is doubtful whether the children of the poorer classes ever wholly escape it. It reaches its height in the winter and declines in the summer. Palm was the first to correlate this seasonal variation with the incidence of sunlight, and thus to anticipate by many years wider discoveries.

Mellanby in 1918 concluded that rickets was really a deficiency disease and that the particular vitamin concerned was vitamin A or something closely associated with it. He found generally that fats richest in vitamin A were the most potent in preventing rickets, cod-liver oil being by far the best.

Soon after the publication of Mellanby's work the American investigators, McCollum, Simmonds, Shipley and Park, and Sherman and Pappenheimer, showed almost simultaneously and independently that rickets could be produced in the rat by diets that were abnormal in their inorganic constituents. They found that rickets

could be produced by diets poor in phosphorus or in calcium, or by diets that contained these elements in unbalanced amounts. More especially was it shown that a diet with a minimum amount of phosphorus could be made a ricket-producing one by the addition of excess of calcium.

Sherman and Pappenheimer proved that soluble inorganic phosphates were most efficient in preventing rickets. The specific action of cod-liver oil in curing and preventing human rickets has been established by many observers. McCollum, Simmonds, Becker, and Shipley proved that the antirachitic substance was distinct from fat-soluble A vitamin. McCollum treated cod-liver oil by combined heat and oxidation until it had lost its power to promote growth; this oil was found, nevertheless, to be potent as an antirachitic agent. This settled once and for all the non-identity of vitamin A and the unknown antirachitic agent.

In 1919 the German physician Huldshinsky reported that he had cured cases of rickets in children by radiating them with the light of a quartz mercury vapour lamp. The action was not local, radiation of one limb healing the rickets of both limbs.

It was proved that the active rays were the short invisible ultra-violet rays. Window glass cuts off these rays. Hess and McCollum showed that the rays of the sun would prevent rickets in rats. If the sunlight is filtered through glass then it does not protect against rickets.

Radiant energy is as important a factor in the cure and prevention of rickets as the unknown substance present in cod-liver oil and other oils. The blood in cases of rickets is low in inorganic phosphorus. The inorganic phosphorus of normal children is about 5 mg. per cent.; in cases of rickets it may fall as low as 1 mg. per cent. Palm many years ago expressed the opinion that rickets is due to insufficient sunlight.

It is well established that rickets is a metabolic disease characterized by bones deficient in calcium phosphate and accompanied by a diminished content in the blood calcium and of inorganic phosphate; that it can be cured both clinically and in experimental animals with certainty by administering cod-liver oil; and that the curative action is not due to vitamin A. It can also be cured with certainty by the action of ultraviolet light. The experiments of Webster show that experimental rickets is accompanied by defective absorption of calcium and phosphorus from the intestinal tract and a very low uptake of these elements from the food supplied.

Other observers have found that this is also the case with rachitic infants. These results suggest very strongly that the primary seat of rickets is the gastrointestinal tract. It has been suggested that the bacterial flora of the intestine may have some influence on absorption but Korenchevsky was unable to produce rickets experimentally by bacterial means. Findlay suggests that the digestive processes are impaired in rickets and quotes some experiments that support this view. The diets used for the experimental production of rickets do so by virtue of their deficiency either in quantity or in balance of calcium and phosphorus, and if this is rectified, then the animals do not develop rickets even if they are deprived of vitamins and radiant energy.

McCollum took rats which were rendered rachitic and starved them for a few days and then killed them. The period of starvation was followed by a marked deposition of lime salts. The break-down of the starving animal's tissues liberated phosphorus and calcium, which were promptly used to build up bone. This tends to show that it is not the rachitic animal's power of forming bone which is at fault, but lack of the raw materials—that is calcium and phosphorus.

A consideration of the evidence given in this paper strongly suggests, then, that the primary cause of rickets is a low calcium and inorganic phosphate level in the circulating blood, and that this is due to defective absorption from the intestinal canal.

By experiments carried out on rats fed on			
Patent flour	..	95	grams
Calcium lactate	..	2.9	"
Ferric citrate	..	2.0	"
Sodium chloride	..	0.1	"

phosphorus starvation was caused and the diet never failed to produce rickets. The following results were obtained—

(1) Confinement *per se* was not found to be responsible for the development of rickets.

(2) A minimum exposure of two hours to bright sun or sky-shine five days a week was necessary to protect rats from rickets under the severe experimental conditions.

(3) The minimum exposure to ultra-violet rays that will prevent rickets was found to be five minutes daily, two feet from the mercury vapour lamp, and about thirty minutes for the carbon, at the same distance.

(4) Rickets was not produced in rats fed on a normal diet and subjected to a high temperature for twenty-eight days.

(5) Providing the diet is adequate, conditions simulating the tropics at their worst, but without any ultra-violet light, will not give rise to rickets in young rats.

(6) Rats fed on rickets-producing diet and exposed to dry heat were given thirty minutes exposure to the carbon daily; none of the rats showed any signs of rickets.

Provided an animal is supplied with food just sufficient to maintain life and a little growth, and a bare minimum of the bone-forming elements calcium and phosphorus, then if ultra-violet light be supplied in adequate amount rickets will not develop, however unfavourable the animal's environment be.

Sulphur can in about half the animals prevent rickets, but its action is uncertain. Magnesium sulphate and thymol proved to be useless as antirachitic agents. Arsenic had some action in preventing rickets.

A group of rats was given one hour's exposure to the mercury vapour lamp weekly, four exposures being given in all; this sufficed to protect them completely from rickets. The antirachitic body in cod-liver oil and ultra-violet light both act in the same way in preventing rickets; this mode of action is a facilitation of absorption of calcium and phosphorus from the intestines into the blood stream.

Steenbock and Black, and also Hess, have published papers claiming that rickets can be prevented in rats by radiating the diet with ultra-violet light. Rats were fed on a rickets-producing diet which was placed under the mercury vapour lamp twelve inches from the burner and radiated for half an hour; the rats showed no signs of rickets. Other rats were fed on the standard diet and in addition received 0.5 gram. daily of an inactive linseed oil that had been radiated half an hour, twelve inches from the mercury vapour lamp; these rats showed no signs of rickets.

In another experiment the patent flour portion of the diet only was radiated; the rats fed on this proved to be free from rickets. Another group fed on the standard diet, in addition received a daily dose of radiated hardened cotton-seed oil. On killing the rats at the end of the twenty-eight days they all showed, on x-ray examination, severe rickets.

These results confirm the work of Steenbock and Black, and Hess—that certain rickets-producing food-stuffs can be made antirachitic by radiation with ultra-violet light.

The Treatment of the Pneumonias.

By JOHN WISHART, M.D., D.Sc., F.L.S.

Prescriber, July 1925, p. 255.

THREE definite lines of treatment are open to us at the present day, and one of these must be adopted at the commencement of the attack. We can choose to treat our case by drugs, by vaccines, or by phylacogens. In addition, there is a treatment common to all three

which must be applied alongside any treatment selected and which may be expressed briefly as "Pneumonia Alphabet" thus:—

Avoid striking-clocks within hearing distance.

Bedclothes; extra light, with cradle.

Cheery and level-headed nurses.

Diet; nourishing and liquid; fruits, given every two hours.

Electric light, candles, or night-lights, but no gas.

Frequently spray sal volatile throughout air of room.

Give patient a 'button-hole' daily.

Hot-water bottles, not smelling of rubber.

Invalid table, travelling or movable, bedpan, urinal.

Joyfully agree to shave patient daily, if need be.

Keep patient recumbent.

Liquids to drink; abundance, especially cold water.

Magazines and newspapers: read cheering news only.

Never let patient know that he is registered as "dangerously ill."

Open windows; provide draught-screens.

Patient's garments; loose, opening at sides.

Quarter-hour increase daily in sitting-up time.

Room; quiet, sunny, fitted with dark blinds.

Sponge palms of hands and lips with cold water often.

Temperature of room 55°F.

Unnecessary movement always avoided.

Vinegar or eau de Cologne applied to forehead frequently.

When temperature normal for seven days, allow patient to sit up.

Exclude all visitors.

Yield refreshing odour by floating essence of peppermint on water in saucer below bed.

Zones of pain massaged when necessary.

It is well to start our patient off from the very first day of his illness with the following mixture:—

Tinct. digitalis.

Tinct. belladonna.

Tinct. nux vom. (ā ā 3i).

Glycerin

Infus. buchu vel scoparii ad 3vi

M. Sig.—'A tablespoonful every four hours in an equal quantity of water after food.'

Digitalis aids the struggling heart (and if given early, should prevent it from having to struggle at all), whilst strychnine and belladonna restore blood pressure by improving the tone of the vessels. A drachm of sal volatile in plenty of cold water, every three hours, is a faithful stimulant in emergency, and if cyanosis appears oxygen inhalations will be very helpful.

There is danger in allowing the temperature to run up to 105°F., and Dr. Wishart prefers to start cold-sponging patients at 104° rather than wait for 105°. He detests chemical antipyretics. Insomnia is treated by paraldehyde per rectum or orally in almond mixture and recourse may be had to morphine hypodermically, but hyoscine, sulphonal, and chloralamide should be avoided in this disease. A diuretic of an alkaline nature will keep the kidneys functioning well. The bowels cause little or no trouble if calomel at night, followed by sulphate of soda in the morning, is given at the start, and treatment followed with a suitable form of liquid paraffin.

During the crisis, the nurse should be constantly at the bedside, stimulants should be given freely, hot-water bottles should be renewed frequently, and hypodermic injections of strychnine administered as often as thought necessary.

At the stage of resolution, expectorants are of little use because the patient pants and is not trying to overcome any respiratory obstruction. Iodides are of little use, physicians are determined to prescribe them, trust is placed in a mixture of morphine with a very little ammonium chloride, along with a tonic such as sanatogen, hypophosphites, glycerophosphates, syr. ferri iodid. with glycerin, malt and cod-liver oil, or the like.

In catarrhal pneumonia antiphlogistine is applied directly to the chest before being covered with warm

cotton-wool. It should be applied on the back of the chest and up to the armpit on each side; warm camphorated liniment should then be applied to the front of the chest—even if only for the mental effect it produces on the patient. One of the most successful vaccines used in the influenza epidemic was mixed anti-influenzal vaccine (St. Mary's Hospital formula), and it was usually only necessary to give dose 1 of the three graduated doses supplied. Pneumonia phylacogen may be given subcutaneously. One c.c. of pneumonia phylacogen is given every eight or twelve hours until four doses have been given, then 2 c.c., and thereafter the amount may be increased as the conditions indicate.

The Diet in Typhoid Fever.

British Medical Journal, May 30, 1925.

V. J. KINSELLA (*Medical Journal of Australia*, February 21st, 1925, p. 183), recommends in a paper based on the study of 760 typhoid patients, a diet consisting of 2 pints of milk, 6 ounces of cream, 4 ounces of sugar, 3 or 4 eggs (in flips, custards, or boiled), 2 ounces of fish, 4 ounces of bread, and 2 ounces of butter, amounting approximately to 3,000 calories.

In spite of the anorexia so common in enteric fever, the 2,000 to 3,000 calories mark is easily reached.

Rectal Injection of Ether in Whooping-Cough.

By C. ELGOOD, B.M. (Oxford).

British Medical Journal, May 23, 1925, p. 963.

ETHER was first suggested in 1914 by Audrain, whose results were published in 1920. He used 1 to 2 c.cm. injected intramuscularly three times a day.

Mason tried ether by the rectum on four cases, using 6 c.c. of a 40 per cent. solution of ether in olive oil. Half of these were successful and half failures. Elgood is the first worker who records cases treated by ether given per rectum.

The enema is painless and the majority of children raise no objection to the repetition of the treatment. The only difficulty lies in getting a certain number of cases to retain it.

The ether was mixed with an equal amount of olive oil, the dose given being 1 drachm of the mixture for every year of age. If anything an excess was given, and if the symptoms were severe and the enema well retained 1 or even 2 extra drachms were given. Before administering the enema the skin round the anus was well smeared with vaseline and the catheter then passed up 3 to 6 inches. The ether mixture was passed into the funnel and allowed to flow into the rectum by its own weight. The rate of flow can be watched through the glass tube connecting the catheter to the tube. When all the enema has been run in, the catheter is rapidly withdrawn and usually none leaks out.

In many cases it did not begin to have any beneficial effect till after the second administration, and in severe cases actually aggravated the symptoms at first.

Elgood treated the first 25 cases with ether alone without drugs and the next 25 with ether and drugs; the latter improved so much more rapidly than those treated with ether alone that the remainder of the cases were always treated with both.

Belladonna was the most generally successful drug. In the cases summarized only four enemas or injections were given—in some cases one each day and in others on alternate days.

Of 58 cases treated by enemas 14 gave up the treatment owing to the parents' objections or because the child would not allow the administration of the enema. Of the remainder, 13 were failures and 31 successful. In addition to these 12 cases of pertussis were treated in the casualty department by enemas and five by injections. Nine were successful; the paroxysms were at once considerably diminished in number and violence, and ceased within a few days. Three

were failures. Two of these patients were already under treatment for bronchopneumonia and the third for anterior poliomyelitis.

SUMMARY.

1. Belladonna seems to be the most useful drug.
2. Ether will check the disease completely in 25 per cent. of cases.
3. Ether neither causes nor prevents complicating bronchitis; bronchitis already present is not a contra-indication to its use.
4. The method of administration seems to be of no importance provided the dose is large enough. Cases treated by intramuscular injections gave similar results.

The End-Results of Pleurisy with Effusion in Children.

By STAUTY GRAHAM, M.B., F.B.F.P.S.G.

Glasgow Medical Journal, July 1925.

THE modern conception of pleurisy with effusion is that it is of a tuberculous nature. This opinion is based not only upon the finding of the tubercle bacillus in the effusion and the lymphocytic nature of the exudate, but also on the fact that many of the patients subsequently develop pulmonary tuberculosis. Bowditch, for instance, traced 90 cases, and found that 32 of them (35.5 per cent.) subsequently became tuberculous. Of Hedges' 130 cases, 40 per cent. developed tuberculous lesions, while Cabot and Hammon in a large series respectively found subsequent tuberculosis in 52.9 per cent. and 29.7 per cent. of the cases.

It would seem from the few reports available that tuberculosis is a less frequent sequela of pleurisy in children than it is in adults.

The material used in the enquiry was obtained from the Royal Hospital for Sick Children, Glasgow. From 1914 to 1923 there were admitted to the wards of this hospital 56 cases of pleurisy with effusion. Only those cases in which the presence of the effusion had been demonstrated by aspiration were included. No death occurred in hospital, but not one on dismissal could be regarded as completely cured since dulness on percussion, with a deficient respiratory murmur, was still detectable at the affected base. As many of the cases as possible were traced and asked to report for x-ray and physical examination. The majority of the cases were seen from three to six years after the attack, and in no instance less than one year after dismissal from hospital.

The von Pirquet reaction was performed in 50 of these cases, and the results are summarised as follows:—

No. of cases tested,	..	50
" " giving negative reaction,	..	8
" " giving positive reaction,	..	42
" " reacting to bovine tuberculin alone,	..	16
" " reacting to human tuberculin alone	..	2
" " reacting to both human and bovine tuberculin,	..	24

Out of 39 cases which could be traced 7 developed a subsequent tuberculous lesion which has proved fatal in two cases, and is likely to prove fatal in a third. In all but one of these 7 cases, the subsequent tuberculosis had manifested itself within one year of the primary pleurisy. The single exception to this is a patient, who developed tuberculous peritonitis seven years after his attack of pleurisy. It therefore appears that the possibility of a recurrence of the tuberculosis in those children who have been well for one year after their attack of pleurisy, is slight.

The most common evidence of a previously existing pleurisy with effusion in a child is a flattening of the affected side. This was detected in 68 per cent. of the cases, but gives rise to no symptoms, and tends to disappear as adult life is reached.

It would seem unlikely that in pleurisy with effusion in children there is a primary lesion in the lung.

"The West Country Method of Rendering Milk Safe from Tubercle."

By H. SCURFIELD, M.D., D.P.H.,

Formerly Medical Officer of Health for Sheffield.

Medical Officer, July 25, 1925, p. 43.

It is curious that although most people like Devonshire cream, the making of it is as a rule confined to the western counties. Those who receive their milk in the raw state and wish to make it safe for children by a simple procedure may be interested to hear the details of the process. It is worth while for a household which consumes 3 or 4 pints a day. The 3 or 4 pints of milk are put in an enamelled iron pie-dish, allowed to stand for a few hours, then placed above the flame of a gas-ring turned very low, and slowly heated to 170°. It is advisable to raise the bottom of the pie-dish a little above the flame by some kind of iron ring or frame. As soon as the milk reaches 170°, it is taken off and put to stand in a cool larder. The cream is skimmed off the next morning and the residual "scald" milk is used for every other household purpose. The children of the house thus get their pint of milk in the form of Devonshire cream and scald milk. The amount of gas required to heat the milk is certainly not more than the gas required to bring milk to the boil.

The process is only available for households which receive their milk in the raw state.

For those who have not gas, any form of heat which answers the purpose will do equally well.

The ordinary method adopted in a Devonshire farmhouse is to heat the milk in earthenware glaze-lined puncheons, holding about 6 quarts each, on the hot plate of the closed range.

Some General Reflections on Public Health Administration.

By J. H. L. CUMPSTON, M.D. (Melb.), D.P.H. (Lond.).
Lancet, July 11, 1925, p. 83.

DR. CUMPSTON deals with distribution of legal responsibility between central and local authorities in various countries and concludes that all of these English-speaking countries, with English tradition as a foundation, have evolved towards an increasing local self-government; but the distribution of authority between the central authority and the local authority has taken different forms in different countries. In England there is the nearest approach to administrative regularity with wide powers of local autonomy and general powers of control and supervision by the central authority. But even in England the evolution of the public health system has produced anomalies—the distribution of health functions between the local authority and the county not being such as to satisfy many whose opinion is valuable. Moreover, the equipment and organisation of efficient public health administration to-day are beyond the resources of many of the 649 rural district councils, and the necessity for finding some more satisfactory system of organisation and for expressing such in the legal code is becoming increasingly apparent.

From these examples it is clear that whether health administration started from a centralised autocracy or from localised autonomy, all governmental systems are reaching, by different paths, a type of health administration more or less uniform. The routine local functions, principally control of the environment, are the concern of the local authority, however, large or small. The general direction of health policy, a paternal supervision, and the control of matters of common application are the duty of the central authority. It is in relation to the intermediate unit that confusion exists, and an analytical contemplation of the whole field impresses one with the conviction that difficulty mainly arises from the increasing range of matters of individual hygiene constantly being brought within the scope of official public health administration.

A recent survey of many practical attempts to codify this whole problem in legal expression as well as in administrative experiment has confirmed the opinion that a general review of the administrative public health system, at least in English-speaking countries, is overdue. The excessive attention recently paid to matters of individual hygiene, to "campaigns," "demonstrations," and the like, has obscured the necessity for progressive order and good government marching in step with other progress—and legal and administrative confusion is imminent where it has not already occurred. A definition of functions, possibly a modification of both the legal code and the administrative systems, is required, and particularly it is necessary that the diffusion of functions among many authorities shall cease and a logical system of graded responsibility be introduced.

The Commonwealth Government in Australia has just appointed a Royal Commission to suggest an organised scheme of rational progress, with defined responsibility distributed amongst the different grades of governmental units, and it is expected that great advances will result from the work of this Commission.

Cow's Milk in Infant Feeding.

British Medical Journal, May 9, 1925.

At a meeting, of the Section for the Study of Disease in Children, of the Royal Society of Medicine, on April 24th, Dr. Leonard Findlay opened a discussion of the question whether modification of cow's milk was necessary in infant feeding.

Dr. Findlay, referring to the generality of infants, had no hesitation in answering the question with a negative. He thought that raw milk ran so many risks of contamination that this danger should not be inflicted on children under 5 years, and pointed out that the ideal—a perfectly clean milk—was economically impossible of attainment. Boiled milk had the advantage of being more digestible than raw milk, and only lacked the antiscorbutic vitamin, which could easily be added. In pathological states, such as fat intolerance, some modification of cow's milk was necessary, but for the average infant Dr. Findlay maintained that whole cow's milk was the best substitute for breast milk. The difference in composition between human and cow's milk would seem at the first glance to warrant modification, and the chief discrepancy was that between the two protein figures. Protein was always dependent for its action upon its constituent amino-acids. The intra-molecular composition of the amino-acids of different proteins varied so greatly that an effective modification was impossible in the present state of our knowledge. Secondly, there was proof available that children were well able to digest whole milk; experiments on their metabolic balance had demonstrated this satisfactorily. There was, moreover, no evidence that a marasmic infant was less able to thrive on whole cow's milk than a normally nourished infant. Dr. Findlay had fed infants on diluted milk, peptonized milk, and citrated milk, but had always returned to the use of unmodified cow's milk. The vast majority of infants thrive on a diet of whole cow's milk. He therefore felt that the modification of cow's milk was uncalled for, except in certain pathological states, and possibly occasionally for infants under 3 weeks old.

Dr. Hugh Thursfield had found that children deprived of breast milk took unmodified boiled cow's milk, protected by an antiscorbutic, with enjoyment, and digested it well. Advice was most frequently asked for children already ailing from some cause or other; generally caused by disproportions in the feeding. It thus became a necessary part of the treatment to modify the food with regard to the particular constituent at fault in the previous diet. It was generally believed by the laity that there was some optimum food for infants which should be defined by the doctors. In his opinion there was doubtless such an optimum for

each individual infant, but the average best at present attainable was represented by boiled cow's milk for the generality of healthy infants.

Dr. R. C. Jewesbury believed that it was absolutely essential to modify cow's milk, taking the average constitution of breast milk as the standard. He considered that there was very little variation in the composition of breast milk if the breasts were completely emptied on each occasion. The method of percentage feeding on this basis, started by Sir Frederick Truby King in New Zealand, and used by himself and others in England, had given every success. Dr. Jewesbury showed charts of the weight curves of infants who were much below normal until they were fed on a percentage modification of cow's milk, when they immediately began to gain and rapidly reached the normal curve.

The Mission to Lepers (Indian Auxiliary).

THE following is an abstract from *The Statesman*, Calcutta, of the 10th December, 1925, on the present position of the Indian Auxiliary of the Mission to Lepers:—

For one-and-fifty years the Mission to Lepers (Indian Auxiliary) has been providing hospitality for some thousands of men and women and children who, but for the Mission's asylums, would look in vain for sympathetic care. "To see the happy faces of the inmates," wrote Mr. Gandhi after visiting the Purulia Leper Asylum last year, "was to realise what loving service rendered in the name of God can do."

The report of the Mission for 1924-25, records *inter alia* the opening of two new asylums—one near Dhaindari in the Central Provinces and the other at Vada-thorasalur in the Madras Presidency—and the introduction of the latest methods of treatment, but as the secretary to the Mission remarks it is of the unsatisfactory nature of a report that it cannot tell the things that really matter most. "It is the individual that matters far more than buildings and tables of statistics. And though a report can tell of buildings erected, record financial position, and tabulate numbers of patients, it can give but little idea of what the Mission Asylums and the Home for Healthy Children mean to each of the 5,000 inmates."

In December of last year Mr. Anderson, the General Secretary of the Mission, on a visit to India, presided at a conference at Naini, which discussed the future policy of the Mission as affected by improved medical treatment. It is hoped so to organise the various institutions that certain ones will be specially fitted for the treatment of early cases, while others will care more especially for the many advanced cases for whom provision must be made until death.

The report states that there has been an increasing eagerness shown to take advantage of the latest methods of treatment, and the desire of the Mission to Lepers to make it possible for its institutions to do the best medical work possible is indicated in the appointment of Dr. R. G. Cochrane to the new post of Secretary for Medical work. Dr. Cochrane came to India in the autumn of 1924 and has since been making a detailed study of the medical work at the various stations with a view to formulating a policy which will most effectively make the Mission to Lepers' Institutions a potent agency in the treatment of hopeful cases. Although the majority of cases in Mission Asylums are advanced ones, and are often suffering from the disabling effects of leprosy rather than from the active disease, yet the modern treatment brings its challenge to provide for every hopeful case the fullest opportunity of recovery. Dr. Cochrane's movements through India have also enabled him to give numerous lectures of an educational character.

In pursuance of the recommendations of the Naini Conference various members of Asylum staffs have in the last year taken a special course at the School of Tropical Medicine, Calcutta.

The work of the Mission is largely that of caring for lepers who are already suffering from the worst effects of the disease. Their need becomes no less because for the early case there is increased hope. The number of applications for admission to numerous asylums has increased, and with its heavy financial burdens, the Mission is faced with greater responsibilities with a smaller income. The income in India last year was Rs. 6,73,470; of this total Rs. 2,57,785 was received from Government and municipal grants-in-aid, the balance of Rs. 4,15,665 representing private subscriptions. Of this amount only Rs. 63,765 was received direct in India, the remainder coming from friends overseas.

The Treatment of Chronic Arthritis.

British Med. Jour., October 10, 1925, p. 633.

At the annual meeting of the British Medical Association "The Treatment of Chronic Arthritis" was discussed by Sir Thomas Horder. The etiological factors are various, and in the great majority of cases, if not in all, more than one factor is present. In such cases the more correctly the value of the particular factors is estimated, the better will be the response to treatment. In some cases there are etiological factors which are obscure.

The infective factor is present to some extent in almost all cases of chronic arthritis. Even in cases which at first sight seem independent of infection there are good reasons for thinking that the microbic factor is contributory. Joint disease due primarily to trauma, to gout, and to trophic diseases of the spinal cord are instances of this statement.

A table of the various types of arthritis arranged according as the element of infection is or is not a dominant etiological factor is given.

INFECTIVE FACTOR	Joint Disease.
	High.
↑	Gonorrhoeal rheumatism.
	Chronic pyæmia.
	Arthritis due to streptococcal, pneumococcal, dysenteric, and coliform infections.
	Tuberculous and syphilitic arthritis.
↓	Arthritis in association with focal sepsis.
	"Rheumatoid" arthritis.
	Osteo-arthritis.
↓	Gout.
	Arthritis in tabes, syringomyelia, hemiplegia, and paralysis agitans.
Low.	Trauma.

The brackets indicate groups of cases having close etiological resemblances.

Arthritis as an expression of focal sepsis forms an intermediate group between the cases of direct joint infection and those termed "rheumatoid" which, owing to our present ignorance of the degree to which the element of infection is present, form the crux of the therapeutic problem.

In this intermediate group, drainage or other appropriate treatment of the area of focal infection is the first step in treatment. If more than one area is involved it is important to determine as far as possible which is primary, and attend to that first. If teeth and tonsils, or teeth and gastro-intestinal tract, are both involved, the teeth should receive thorough attention and an interval be allowed before drastic measures are employed in regard to the tonsils and the bowel. So also with the throat or nose on the one hand and the rest of the respiratory tract on the other.

Streptococci, both hæmolytic and non-hæmolytic, are probably by far the most common micro-organisms concerned in the infective element in arthritis. This holds good equally for intestinal as for other subinfections.

Advantage may be taken of this fact in treatment when the bacteriological evidence is indecisive.

Antigen therapy should be supplementary to drainage of the infected area, not a substitute for it. The decision to employ antigens should be deliberate, and, the decision being made, the choice of remedy and system of dosage should be very carefully considered. The patient should be warned against expecting quick results and encouraged to co-operate in a thorough trial. His immunity mechanism should not be flogged, but rather coaxed, by the remedy.

In undertaking drainage of the intestine, consider the diet, both from the point of view of lowering the bacterial content and from that of mechanical cleansing. These considerations are probably of greater importance than is the use of "intestinal antiseptics." Amongst the latter measures, however, the older agents, such as mercury and salol, should not be forgotten. The value of a drug is rarely proportionate directly to the amount of money spent upon advertising it.

In the great majority of cases chronic arthritis is part of a general disease. The patient requires treatment as much as, and sometimes more than, the joints. This fact involves two important factors—the nutritional and the nervous; they overlap in many cases.

In treating the nutritional factor the general habits must be passed in review; much the same régime should be adopted as is followed in any case of chronic infection—for example, as in pulmonary tuberculosis; ample fresh air, bodily and mental relaxation, the avoidance of codding, a full and liberal dietary, and graduated exercise. Diet fads are to be rigidly avoided. The best drugs in this connexion are arsenic, iron, cod-liver oil, and the hypophosphites.

On the nervous plane a series of strains should be remembered: emotional shock, the prolonged nursing of friends or relatives, child-bearing, the menopause, fears of crippling, etc. Habits of invalidism and the paraphernalia of the sick-room must be combated. Small doses of thyroid are often helpful, especially in the older patients.

The metabolic factor is difficult to assess, but should be carefully sought. The experienced observer can often detect the factor of gout even in the presence of obvious sepsis. To omit appropriate treatment is to leave untouched an important and sometimes very amenable part of the pathogenesis. Colchicum and alkalies are indicated for acute or subacute exacerbations; in chronic conditions atophan or atouquinol should be tried. The last named drug is sometimes very useful even when gout is not obviously present.

For effusions iodine is invaluable. Nothing seems to excel the tincture, given in the form of the French Codex preparation (10 per cent.). It is best ordered in minim doses, taken in milk, between meals: 1 minim a day, with an increment of 1 minim daily until 30 minims are reached, keeping at this dose for a month, and then gradually diminishing, the course being thus one of three months' duration. When the dose reaches 6 minims daily it may be taken in two doses, and when the dose reaches 9 minims it may be taken in three doses. For the relief of pain in addition to local measures there is nothing as a rule so helpful as aspirin. Climate is certainly less popular in treatment to-day than formerly. The indifferent food, the risk of intercurrent infections, and the strain of travelling make a trip to foreign climes of dubious advantage. There is the added obstacle that such an enterprise holds up most of the other helpful measures of treatment. There is a large function for spa treatments, quite apart from the local effects upon the joints. Of radium waters and radio-active mud we are only now beginning to learn the potentialities.

In the local treatment it is necessary to remember that structures other than the mere tissues of the joint proper show the effects of inflammation and malnutrition: the bursa, the tendon sheaths, the fasciae, the nerve trunks, the skin, and especially the muscles. If local

measures are to be really useful, all these must be passed in review and their condition noted. No mere rule of thumb treatment is of any service; rather does such absence of method or reason often render disservice. Massage, so eminently useful in the majority of cases, is grossly abused in others, where muscle spasm exists as a contraindication, though usually temporary. Ionization and diathermy have their advocates, and what is termed, with an attractive note of hope and economy, electrical massage. Unless the electrotherapist can tell us clearly what is his conception of the pathology of the local condition and what it is he aims at doing, we may at least hesitate to follow his advice, however enthusiastically given. There is one *sine qua non* in regard to all local measures, and that is the necessity for getting the patient's confidence; unless this is secured the result is doomed to failure.

In the restoration to function of the wasted muscles and the stiffened joint, active movements undertaken by the patient take a very prominent place. No amount of merely passive movement ever succeeds in substitution for this. The patient must be constantly encouraged into making these efforts for herself under pain of permanent crippling. Simple forms of apparatus which assist voluntary efforts are useful—balls of different sizes to be clenched by the hands, the wheel of a sewing machine for the wrists and shoulders, a treadle machine for the ankle and hip.

General Effects of Local Treatment.

All efforts made to restore and improve the function of diseased joints react beneficially on the disease itself. This should be explained to the patient. Moreover, the practitioner should have constantly before him the possibility of spontaneous arrest of the disease, or arrest, the result of his general treatment.

The orthopaedic treatment of fixed joints resulting from chronic arthritis is a science and practice in itself. Its importance is even yet scarcely appreciated. The first essential to correct methods is a good radiogram. The second is examination under a general anæsthetic. Experience shows that in many cases several slight forcible movements, at intervals determined by the particular case, are better than one severe wrench.

Dr. Preston King, Honorary Consulting Physician, Royal Mineral Water Hospital, Bath, dealt with spa treatment.

"Bath possesses the only thermal springs in the United Kingdom. The waters rise to the surface at a temperature of 117° F. and in a volume of about half a million gallons daily. The analysis of these waters is open to you all, and is contained in the handbooks that are published, so I need not trouble you with that now, beyond saying that, they contain no specially active salts, and are, therefore, classed among those that are called "indifferent." These various "indifferent" spa waters, however, are all-known to have a special character of their own in the treatment of disease, but to what that special character is due we do not know. Bath waters are slightly diuretic as compared with ordinary water, and are also radio-active to a marked degree. Naturally this latter fact is made much of by the city authorities in matters of advertisement; but whether we are justified in laying any stress on this property to explain their action I do not know. I do know this, however, and it is one thing that is certain about their use—and that is that certain cases, and especially those which are due to gout, do improve here in a wonderful way."

"There is one other factor which helps, and that is faith, which makes towards recovery. The patient, after a long illness and the use of many remedies, finds himself at a health resort, amid surroundings laid out for treatment, and in a place where the whole atmosphere breathes hopes of recovery."

In treating chronic arthritis by hydrotherapeutic methods we are treating results, and not causes, and the cases as we see them will vary as I have said, from those of slight stiffness and pain on movement and a little synovial thickening, to those later stages of disorganized

joints with eroded cartilage, irregular bone formation, and fibrous or even bony ankylosis. These patients come for cure; but it is obvious that no benefit, beyond perhaps some alleviation of pain, is possible.

In the treatment of chronic arthritis by waters, or by any other means, it is not only stiff and painful joints, but also the patient behind them, that we have to think of. It is of little use in the end to see the swellings reduced and the joints more free if the general health suffers in the process. This especially applies to those asthenic cases of rheumatoid arthritis in women where the fusiform synovial enlargement of the joints, especially of the smaller ones, is accompanied by a quick pulse, a moist skin, and general debility. Such cases not only do not improve but tend actually to get worse by bathing. For them a general tonic treatment, with good food, fresh air, and massage, is by far the best.

In treating chronic arthritis by means of baths, the hot water lessens the tension and relieves the pain and allows more movement to the joint. Bath, with its abundance of hot water, can supply this treatment freely in its so-called deep and reclining baths. This is its oldest form of cure, the one upon which its reputation was first founded, and it still remains its peculiar speciality. Immersion in the water is followed by the pack in hot sheets and blankets for from fifteen to twenty minutes, and this time might be extended with benefit and comfort. A glass of the water is taken while in the bath, and this encourages a more healthy action of the skin during the pack.

Whether this is exactly so or not, the fact remains that much benefit follows a thorough washing out of the colon. This is done by means of the Plombieres system, where a pint or more of hot water is allowed to flow into the rectum, acting as an ordinary enema, to be followed by another and more copious flow which reaches the whole course of the colon.

Many cases of chronic arthritis improve more when active movements on their own part are encouraged rather than when they are subject to the passive movements by the masseur. For these the warm swimming-bath is very useful.

The tone of the muscles is restored and there are no muscles so suitable for moving a joint towards recovery as are its own. Ionization can be applied directly to the joints affected, through packs of lint soaked in a weak solution of sodium salicylate, lithia, or an iodide; it is often of great use in reducing the synovial swelling. Then also there is the radiant heat, either by the Greville or the Dowsing steam, where the whole body or a particular joint is exposed to a temperature considerably above boiling point. And then there is a room which looks like a cross between a gymnasium and a torture chamber, where by mechanical contrivances passive or active movements can be obtained by means of wheels and pulleys. This system is useful in some of these cases of chronic arthritis where the stiffness of a joint is due to fibrous adhesions. It can easily be understood, however, that it needs using with care, lest by too much force the condition of some quiet joint be converted into a more acute and painful arthritis."

Reviews.

COLLECTED ADDRESSES AND LABORATORY STUDIES OF THE LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE. VOL. I; 1924-25.—Compiled by Professor R. T. Lelper, F.R.S.

THE London School of Tropical Medicine has now become the Division of Tropical Medicine and Hygiene of the new London School of Hygiene and Tropical Medicine; and with the change in status of the School it was felt desirable to slightly alter the form and scope of its "Collected Papers." In this form, as an annual volume, the work of the School will become better known and exchanges of literature will be facilitated.

The volume before us is a notable addition to the literature in tropical medicine in all its aspects. It consists of reprints of over 40 papers from 16 different journals, bound into a single volume. As these have all appeared in press before, and some of them have already been abstracted or reviewed in our columns, the book scarcely calls for review except as a collective publication. It will interest the many old students of the London School however to know of its existence. No price is given, and we suppose that the volume is one for private circulation only.

We have browsed through its very attractive pages with much appreciation. Dr. Andrew Balfour's addresses are fascinating reading. "New conceptions in the teaching of Public Health" is an outline of the inception and policy of the new London School of Hygiene and Tropical Medicine. "The Historical Aspects of Malaria" is a forceful and picturesque essay. "The Trend of Modern Hygiene" is an address which will appeal to all sanitarians; whilst "Vistas and Visions: Some Aspects of the Colonial Medical Services" is almost a world-wide review of the chief medical and hygienic problems of the British Empire.

The actual papers themselves naturally cover a very wide field, dealing with tropical diseases, bacteriology, protozoology, helminthology, entomology and even veterinary medicine. The whole volume is a fine and worthy publication of the famous School from which it is issued.

TAYLOR'S PRACTICE OF MEDICINE, 13TH EDITION.—By E. P. Poulton, M.D., F.R.C.P. London: J. & A. Churchill, 1925. Pp. 1063, with 48 plates and 93 text figs. Price, 28s. net.

TAYLOR'S "Medicine" has held its position as the leading or one of the leading text-books on medicine during the present generation. It is pleasing to find that the latest edition ensures a continuance of the place of honour which has so long been held by our old friend. Since the former edition was issued three years ago, Dr. Poulton has extensively revised the work, and it is now thoroughly abreast of the times. Several new articles have been added. A new feature has been introduced, numbered references are given to the most important articles in the recent literature of medicine, so that it will be easy for the reader to obtain more detailed information on matters which have been subjects of recent advances in our knowledge. The radiograms which are given are of great value to the student. The book is thoroughly up-to-date, but it is pleasing to note that there has been no frantic effort to include unproved "up to the minute" information. The articles on tropical diseases are less satisfactory than those on the common diseases of cooler countries, but this is a common feature of general text-books of medicine. Such closely related diseases as sandfly fever and dengue are widely separated from each other in the book. The treatment of cutaneous leishmaniasis is given at the end of the brief article on kala-azar but no account of the disease itself is given. Hunger oedema is stated to be "probably identical with epidemic dropsy," and generally speaking, we cannot recommend the volume as being specially helpful to the student of tropical medicine. The articles on the great diseases of colder climates are on quite a different plane, they are authoritative and in every way satisfying; if any are to be picked out for special praise they are those on rickets, asthma, pernicious anaemia and peptic ulcer.

The book will certainly be a great success; what is more important, it thoroughly deserves to be so.

THE AMERICAN ILLUSTRATED MEDICAL DICTIONARY.—By W. A. Newman Dorland, A.M., M.D., F.A.C.S. Philadelphia & London: W. B. Saunders Co. 13th. Edition, 1925. Pp. 1344, profusely illustrated; flexible binding with thumb index. Price, 37s. 6d. net.

THIS splendid work is now a classic, and has been through thirteen editions since its first appearance in

1900. In the preface to the thirteenth edition, it is stated that some 2,500 new words have been added. The book is something more than a mere dictionary; it is a compend of the terms used in medicine, surgery, dentistry, pharmacy, chemistry, nursing, veterinary science, biology and even medical biography. A very valuable feature of the work is that the derivation of each word is given, together with much collateral information of an encyclopædic character.

The work is thus exhaustive and exceedingly valuable; its colour plates and numerous illustrations alone make it very attractive. To anyone with much writing for medical journals to do, it is a veritable necessity; to even the general practitioner, however, it will make a very strong appeal. In one respect the book is American rather than English; for instance, we looked up "ætiology"—which is the correct etymological spelling of the word, but found only "etiology," which may be more popular but is less correct. This however is an exceedingly minor point. We looked up several different tropical diseases and were pleased to find the information given accurate and up-to-date. From *z* to *z*ymurgy, the volume is replete with information. We wish that all of the more frequent of our contributors would purchase and use this celebrated dictionary; it would lighten our editorial duties by at least 50 per cent. As it is, we shall frequently be compelled to resort to it ourselves. Anyone who thinks that he can spell has only to try editorial work for a year or two; he will then find that correcting the spelling of others has ruined his own. The wider the circulation of this splendid work in India, the better we shall be pleased.

THE ART OF MEDICAL TREATMENT. WITH REFERENCE BOTH TO THE PATIENT AND TO HIS FRIENDS.—By Francis W. Palfrey, M.D., Visiting Physician, Boston City Hospital, Instructor in Medicine, Harvard University. London and Philadelphia: W. B. Saunders, Ltd. Pp. 463. Price, Cloth 21s. net.

This book aims at giving the essentials of medical treatment in an explicit and condensed form. The instructions are on the same lines as those contained in the standard text-books of medicine, and for this reason the average medical student is not likely to find this separate volume an essential in the acquisition of knowledge.

The practitioner who desires to bring his knowledge up-to-date will find the volume useful and instructive. As is usual in such books the sections on tropical diseases are neither so full nor so up-to-date as could be desired. Most of us would appreciate the inclusion of a few prescriptions; though the writing of a prescription forms only one part of the treatment of a patient it is nevertheless an important part.

The book is produced in the usual excellent style of Messrs. Saunders.

SYNOPSIS OF MEDICINE.—By H. Letheby Tidy, M.D. 4th Edition. Bristol: John Wright & Sons, Ltd., 1925. Pp. 1000. Price, 21s. net.

A HANDY book containing all important recent information useful for students in revision, for practitioners in looking up the modern literature and for teachers before lecturing. This edition is entirely rewritten and the recent work on asthma, diabetes and jaundice is included. Students of tropical medicine will be disappointed in not finding in it sufficient up-to-date information. The author, however, is to be congratulated as the book is an excellent general synopsis of general medicine.

CATECHISM SERIES. EDINBURGH: E. & S. LIVINGSTONE. MIDWIFERY; PARTS I & II. MEDICAL BACTERIOLOGY AND PROTOZOOLOGY.—By W. R. Logan, M.D., F.R.C.P.E.; Parts I & II. **DISEASES OF THE EYE.** By W. G. Sym, M.D., F.R.C.S.E. Price, 1s. 6d. net each part.

We confess that we do not like this type of book. Medicine is a science and art which has to be mastered, and spoon-feeding of students, a bad habit in the

English medical schools, is even more dangerous in India. Yet there is no doubt that this little class of book is very popular, and the volumes which we have received are all in their second or third edition. They meet the need of the medical student for final rapid revision for examinations, although they can in no way replace systematic text-books. The "Catechism Series" is well got up, well printed and handy. What is more, the information given is accurate, and the publishers are a very well known firm with a high reputation. The price is within reach of the pocket of even the poorest student.

THE MEDICAL ANNUAL GENERAL INDEX, 1915—1924.—Published by John Wright & Sons, Ltd., Bristol. Pp. 301. Price, 12s. 6d. net.

This index deals with the contents of the last ten volumes of the *Medical Annual*. It will be found invaluable to the thousands of medical men who subscribe to the *Annual*, constituting as it does a guide, to all the most important literature of the past ten years.

THE STUDENTS' POCKET PRESCRIBER.—By Dr. D. M. Macdonald, M.D., F.R.C.P.E. 9th Edition. Edinburgh; E. & D. Livingstone, 1925. Pp. 226. Price, 3s. net.

In a miniature volume which will readily go into the vest pocket, the author has condensed no less than 551 prescriptions with directions for use. They are arranged according to the diseases for which they are intended.

There is a great deal of information on prescribing, a table of doses, a vocabulary, diet tables, etc. This handy and cheap volume will be found very useful by students and doctors. It has reached the 9th edition and is becoming increasingly popular.

THE BOOK OF PRESCRIPTIONS.—By E. W. Lucas, C.B.E., and H. B. Stevens, O.B.E. 11th Edition. London: J. & A. Churchill, 1926. Pp. 382. Price, 10s. 6d.

THE 11th edition of this useful and well known handbook has been issued after nearly 12 years. The present edition has been thoroughly revised and a large number of useless remedies have been deleted, while new useful remedies such as new compounds of arsenic have been introduced. Brief notes on the pharmacological action of drugs enhance the value of the book and we recommend it to the notice of students and practitioners.

FAVOURITE PRESCRIPTIONS.—By Esplne Ward, M.D. (Belfast). London: J. & A. Churchill, 1926. Pp. 96. Price, 5s. net.

This book is divided into three parts. The first part consists of dosage tables, the second part gives hints for treatment of poisoning, and the third part gives favourite prescriptions arranged according to the diseases and symptoms for which they are used. The prescriptions given are well selected, all incompatibilities being carefully avoided. The book is interleaved, thus providing room for any additions. We feel certain this little edition will be of use to students going in for examination, and to practitioners generally.

ELEMENTS OF SURFACE ANATOMY.—By I. McLaren Thompson, B.Sc., M.B., Ch.B. (Edn.), Assistant Professor of Anatomy, McGill University, Montreal. Edinburgh: E. & S. Livingstone, 1925. Pp. 172. Available from Messrs. Butterworth & Co. (India), Ltd., Post Box 251, Calcutta. Price, Rs. 4-2 or 5s. 6d.

This small book consists of five chapters dealing with the surface anatomy of the five parts of the human body, viz., the head, the neck, the trunk, the superior extremity and the inferior extremity. The English translation of the B. N. A. has been adopted in the description, but the old nomenclature has with advantage been inserted within parentheses, the first time each term occurs. By including the clinical

significance of the surface anatomy of the parts the author has broken the dull monotony of points and lines and made the subject interesting. Attempts have been made to point out the correlation of the facts of the surface anatomy to those of descriptive anatomy and students of medicine will appreciate them very much. It is true that surface anatomy can only be learnt by marking the position of the parts on the living body, but the illustrations added to this book will help in that direction and make the book more useful and attractive to students in general. The descriptions have been written in a very simple, clear and lucid style. The system of tabulation adopted in some places will be very useful to students.

We strongly recommend the book to every student of medicine, who will find it interesting and useful reading.

HAND ATLAS OF HUMAN ANATOMY.—By Werner Spalteholz, Professor of Anatomy, Leipzig. Translated by L. F. Barker, Professor of Clinical Medicine, Johns Hopkins University. 5th Edition in English. London: J. B. Lippincott, 1925. Three Vols., Price £4-0-0 net per set. Obtainable from Messrs. Butterworth & Co. (India), Ltd., Calcutta. Price, Rs. 60 net per set.

This beautiful atlas has been translated into English, Italian, Russian and Spanish. In three volumes there are nearly a thousand excellent illustrations, many of them in colours.

The atlas will be much appreciated by surgeons and anatomists, also by medical men who desire to refresh their knowledge of anatomy in the easiest possible manner.

In common with almost all works on anatomy the book ignores the blood supply of the spinal cord. The lymphatic system also is omitted. The atlas would be greatly improved by a set of illustrations showing the bones and viscera as seen by radiography.

Apart from these omissions there can be nothing but praise for the beautiful and accurate plates which are produced in the best German style. The text is concise and to the point, and though the older generation of medical men are more familiar with the old English nomenclature they will have no difficulty in recognizing the international Latin names which are employed.

MANIPULATIVE SURGERY: PRINCIPLES AND PRACTICE.—By A. G. Timbrell Fisher, M.C., F.R.C.S. London: H. K. Lewis & Co. Pp. VIII plus 168. Illustrations, 62. Price 7s. 6d. net.

This book will be welcomed by those who are forced to admit the successes of the bone-setters and who desire to read an authoritative account of manipulative methods by a skilled surgeon.

The author deplores the obstinately conservative attitude of the medical profession towards manipulation and in this connection records with approval the reply of John Hunter to Sir Astley Cooper who reminded him that a year before, he had expressed a different opinion. Hunter's reply was "Very likely I did, I hope I grow wiser every year." The slow and painful rise of surgery is described, how in 1745 the surgeons of London were set free from their association with the old company, the "Masters of the Mystery and Commonalty of the Barbers and Surgeons of London" and how early in the nineteenth century the Royal College of Surgeons was founded. Hunter advocated movement of inflamed joints after the subsidence of acute symptoms, but a new school of thought was introduced by Hilton and Thomas who believed that rest could not be overdone. These surgeons were probably influenced by the havoc which was wrought by the reckless bone-setters of the early nineteenth century. Sir James Paget in 1867 enumerated "Cases that Bone-setters Cure" and advocated learning what was good from the bone-setters.

Wharton Hood, Sir Robert Jones, and others have advocated a liberal attitude towards manipulation, but even now the old prejudices are but slowly dying and

there is still much room for improvement in the teaching of manipulative methods. The chief difficulty in connection with manipulation is to decide on the cases which are suitable and on the time when manipulation should be undertaken and it is on these points that the book under review is most helpful. There will always be cases in which the cautious surgeon holds his hand and which are relieved by the more daring and less instructed bone-setter, but on the other hand patients will gradually learn that considerable risk attends treatment by persons who are not conversant with the pitfalls of the surgery of joints. The future development of manipulative surgery will probably be in the direction of specialism and it is essential that the medical profession should foster the formation of a class of surgeons who have a good knowledge of general surgical work and who have also received a special course of training in manipulative surgery. A refusal to admit that there is any virtue in manipulative technique will only result in forcing patients into the hands of the unqualified bone-setters to the detriment of the profession and the public. Mr. Fisher's book should be studied by every one who is engaged in surgical practice.

MALIGNANT DISEASE OF THE TESTICLE.—By Harold R. Dew, M.B., B.S. (Melbourne), F.R.C.S. (Eng.), F.A.C.S. London: H. K. Lewis & Co., Ltd., 1925. Pp. 168, with 52 illustrations including 5 coloured plates. Price, 21s. net.

This excellent monograph—unique of its kind—embodies the author's experience of malignant disease of the testicle, a subject that of recent years has increasingly interested pathologists and surgeons. It comprises a review of the literature and a study of 40 cases of this disease.

The author discusses the anatomy and development of the normal testis, the morbid anatomy, histology of testicular neoplasms, the frequency of the various types of tumours, the clinical aspects and diagnosis, the prognosis and treatment. The monograph is written in a clear and attractive style, is illustrated mostly from original specimens and includes an appendix of the case histories.

We congratulate the author on his work and strongly recommend it as of great value to surgeons who are interested in these diseases.

SOME ENCOURAGEMENTS IN CANCER SURGERY.—By G. Grey Turner, F.R.C.S. (Eng.). Bristol: John Wright & Sons, Ltd., 1925. Pp. 75. Price, 7s. 6d. net.

The surgery of malignant disease is full of disappointments; it is a record of much labour with too little reward. As a result there is a natural pessimism in the teaching and practice of this branch of surgery.

In this little book Mr. Grey Turner gives us a record of cases, early and late, where the disease has been eradicated for years, and we welcome the 'encouragements' which his industry has provided.

There are forty good illustrations and the book is admirably produced.

Earlier diagnosis is only possible when the public is better educated and the medical profession has a great responsibility in this direction.

Every surgeon will read Mr. Grey Turner's book with pleasure and profit. It is only by such collections of verified cases that we can properly realise how many lives can be saved and even seemingly hopeless cases added to our list of triumphs.

MODERN SURGERY: GENERAL AND OPERATIVE.—By John Chalmers DaCosta, M.D., LL.D., F.A.C.S. 9th Edition. Philadelphia & London: W. B. Saunders, Ltd., 1925. Pp. 1527, with 1200 illustrations. Price, 45s. net.

This well known work has run into its 9th edition and this in itself is its best commendation. The work is well illustrated, the print however is on the small side.

It is really an exhaustive work, and each section has been rewritten by someone specialised in that section. The references are numerous.

One notices with satisfaction, in such a subject as burns, that the old classification of first, second and third degrees is done away with and a proper classification substituted which deals only with the layers involved.

The writer has left out surgical bacteriology, asepsis and antisepsis in order to make room for other material. One is inclined to regard the omission of this groundwork of surgery as an error; asepsis is of much paramount importance in surgery. On the other hand the author has found space for an extensive consideration of carbon monoxide poisoning, asphyxia and drowning. Most surgeons would probably prefer to see an exhaustive account of asepsis, rather than of carbon monoxide poisoning. Electrothermic methods of treatment of neoplasms, and radium treatment rightly find a place.

The title "Modern Surgery" is well chosen and one can confidently recommend the work.

THE SURGERY OF PULMONARY TUBERCULOSIS.—By John Alexander, B.S., M.A., M.D. Published by Lea & Febiger, Philadelphia & New York, 1925. Pp. 356. Illustrated with 53 engravings and 12 plates.

THIS book goes thoroughly into the question of compression in the treatment of tuberculosis of the lungs.

The following paragraph explains the benefits to be hoped for from compression:—

"Pulmonary compression constitutes a 'physiologic amputation.' Stagnant secretions and products of degeneration are removed from the body and tend to cease to form because of pulmonary rest, subsidence of non-specific inflammation and encapsulation of the tuberculous lesions. After the modern Brauer or Wilms-Sauerbruch thoracoplasty there is little or no chest wall and mediastinal flutter and respiratory function of the compressed lung is greatly reduced and sometimes practically abolished. There occur a passive congestion in the blood-vessels and a stasis of lymph. The most striking anatomical result of pulmonary compression is a profuse proliferation of fibrous tissue which encapsulates the tuberculous lesions and closes cavities and renders the disease inactive."

There are two methods of producing compression, viz., by causing pneumothorax by introducing gas into the pleural cavity, and by the operation of thoracoplasty, which causes collapse of the one side of the chest by resection of the posterior portions of the ribs.

The comparative merits and demerits, dangers and uses of these two methods of producing compression are dealt with in chapter 5 and the following conclusion is arrived at:—

"In the future when the surgery of tuberculosis is more widely known and better understood it is likely that large numbers of far-advanced cases that are now treated with pneumothorax will be operated upon by choice. At present, however, few physicians or surgeons would be so rash as to advise thoracoplasty as the first step in compression therapy, if they had reason to believe that an entirely satisfactory pneumothorax could be produced. Whether or not such a one is possible can be determined only by actual trial. If after a pneumothorax is obtained and a phrenicotomy added, it is found at any time and for any reason that continuation of the pneumothorax is liable to prove dangerous or unproductive of a satisfactory clinical result, thoracoplasty should promptly be performed. The preliminary pneumothorax and phrenicotomy and the improvement in the patient's condition, though it may only be slight, will have bettered the chances of the operation's success."

The two best known operations are thoroughly described, viz., "Wilms-Sauerbruch" and "Brauer." The latter differs from the former chiefly in removing a greater length of the ribs. The former operation

may be done either at one sitting or in two or even three stages. Some are in favour of resection of the first eleven ribs; when possible the author is in favour of resection of the first seven ribs along with phrenicotomy, which latter operation gives rest to the lower part of the lung by causing paralysis of that side of the diaphragm.

The operations and the results of operations are very well illustrated and the results of paravertebral thoracoplasty are given in tabular form.

In the early chapters the anatomy and physiology of the chest are dealt with very fully and clearly.

The book finishes with a very full bibliography of some 500 books and other writings.

This work should be in the hands of every surgeon and of every specialist in tuberculosis.

SWANZY'S HANDBOOK OF THE DISEASES OF THE EYE AND THEIR TREATMENT.—Edited by Louis Werner, M.B., F.R.C.S.I. 13th Edition. London: H. K. Lewis & Co., Ltd., 1925. Pp. xvi plus 698. Price, 21s. net.

THIS well known old text-book presents little change from previous editions; it has increased slightly in size and the chapters on diseases of the iris, ciliary body and choroid are partially rewritten. It remains as before a sound practical text-book embodying the experience of two very careful ophthalmologists, but does not describe the most modern methods of examination of treatment.

A TEXT-BOOK OF PHYSIOLOGY.—By William D. Zoethout, Ph.D. 2nd Edition. St. Louis: The C. V. Mosby Co., 1925. Pp. 616. Price, \$4.50.

THE author in the preface says that this book is intended to fill the gap between the larger text-books on the subject and those offering a briefer course. In this he has succeeded. The subject matter is discussed in a systematic manner and all the unnecessary detail has been left out. The sections dealing with the practical sides of nutrition, physical exercise, fatigue, etc., are particularly well written.

We recommend the book to students preparing for the examinations of the State Medical Faculty in this country.

THE HISTOLOGY OF THE MORE IMPORTANT HUMAN ENDOCRINE ORGANS AT VARIOUS AGES.—By Eugenia R. A. Cooper, M.D. London: Humphrey Milford, Oxford University Press, 1925. Pp. 119. Price 12s. 6d. net.

THIS publication represents a careful and detailed histological study of the pituitary, suprarenal, thyroid, parathyroid and thymus glands. The materials were obtained at various periods from intra-uterine existence to old age, and a useful description of their appearances is given as seen at different stages of development. Each description is terminated by a synopsis correlating structure with function.

The work will be found of much value by pathologists as a supplement to books dealing with general normal histology.

There are numerous illustrations which include many good photographs of gross and microscopical preparations.

INFECTION, IMMUNITY AND INFLAMMATION.—By F. B. Gurd, B.A., M.D., C.M., F.R.C.S. St. Louis: C. V. Mosby Co., 1924. Pp. 329. Price, \$5.00.

THE immediate object of this work is to present in a form suitable for clinicians the salient facts regarding hypersensitiveness and its relation to other immunological processes, for the purpose of controlling disease processes in man by serological methods. To this end the author has written a quite well arranged book. After a general presentation on the usual lines of the chief facts and theories of immunity, the latter

part of the book is devoted to the application of immunological principles to the control of disease in man. The contributions of immunology to practical therapeutics have, however, up to the present not been as extensive as was at one time expected, and this part of the field is therefore somewhat restricted.

A useful chapter on anaphylaxis in man is given. Vaccine and serum treatments are described in many diseases, e.g., pneumonia, diphtheria, tetanus, rabies, hay fever, etc., as also are the chief tests, the Schick and Dick reactions, etc.

Although the book is more especially concerned with hypersensitiveness, we think a chapter on the clinical interpretation of Wassermann results would have been worth including as the book is intended more particularly for clinicians; and the Wassermann test is perhaps the most striking contribution immunology has made to medicine. The only account given of this test is a brief description of the method and its underlying principles. There is a great deal of useful information given in the book which will no doubt be acceptable to clinicians for whom it is more particularly intended.

ESSENTIALS OF PSYCHIATRY.—By G. W. Henry, M.D. London: Balliere, Tindall & Cox, 1925. Pp. xiv plus 199. Price, 13s. 9d. net.

ALTHOUGH this book is in many respects a hotchpotch, there is a good deal in it which will repay careful study. As is only too common in American books, the language in which it is written makes it terribly tedious in places. To take one example, the short dedicatory note to Dr. William Logie Russell, is devoid of either grammar or sense.

Very few psychiatrists will agree with the author's views on the development of personality. For instance, it is hard to imagine any truth in the statement that the sexual instinct "is responsible for the formation of what has been called the social or herd instinct," especially, when on the next page the author observes, "during the period of adolescence there is frequently conflict between the sexual and social instincts." The very difficult question of a classification of mental disorders is discussed and there is much to be said in favour of the classification advocated by the author. There is a good chapter on psychiatric nursing by a former Directress of Nursing at the Bloomingdale Hospital. It is astonishing, but none the less gratifying, to learn that in certain hospitals in the United States 75 per cent. of the patients are admitted upon their own application.

Dr. Henry gives an interesting list of great men whose lives have shewn them to have been markedly psychopathic. It is curious that an American writer should have omitted Edgar Allan Poe from a list of this description.

The chapter devoted to the medico-legal aspects of psychiatry is very disappointing. Foreign readers would have liked more information on this very important subject to enable them to compare the attitude adopted towards insanity by American law with that adopted by the law of their own lands.

The book ends with a short note on the actual making of the book, in which is given a nominal roll of all the persons who took part in the work. There is also a very useful bibliography of works of reference published in English.

OBJECTIVE PSYCHOPATHOLOGY.—By G. V. Hamilton, M.D. St. Louis: C. V. Mosby Co., 1925. Pp. 354. Price, \$5.00.

THIS book is introduced to the public in a most enthusiastic preface by Professor Robert Yerkes, the eminent American psychologist. Professor Yerkes writes:—"Though little known and less understood by psychologists and psychopathologists, Hamilton's discoveries are undoubtedly of fundamental and far-

reaching importance. I venture to predict that he will presently find himself the leader of a school of psychopathology which will as importantly modify our current conceptions of reaction tendencies and their relations as has psycho-analytic methods our notions about mental content." Certainly Dr. Hamilton has written a very interesting book and that too in such a way as to place beyond question the honesty of his convictions. The author's researches have included not only nervous patients but relatively "normal" adults and children, as well as animals. Dr. Hamilton begins the exposition of his theory of the existence of what he terms a "persistent, non-adjustive, affective reaction" by discussing clinical reports on two hundred nervous cases.

The author pays tribute to the concepts of the psycho-analytical school of psychologists to whom, he states, he is indebted for help in formulating his views on the reactions of man and animals to sexual stimuli.

It is a matter for great regret that a mind which thinks so keenly as that of Dr. Hamilton's cannot express its thoughts in clearer language. Sympathetic readers of this book—of which there are sure to be many—cannot escape feelings of blank despair in their attempts to get hold of the exact meaning of a great deal they will encounter. To take only one example:—"Somatic discomforts and disabilities, and dysteleologic overt adjustive movements which are obviously not due to toxic, traumatic and other gross interferences with vegetative and behaviouristic functions, and which cannot be explained as direct reactions to any kind of discoverable stimulation, ought always to lead the clinician to a quest of stimulation to which the patient is more or less continuously subjected, to which he cannot acquire actual unresponsiveness and to which he cannot react directly without suffering a real or imagined disadvantage."

The book contains an admirable bibliography as well as a glossary of technical terms. The latter will be of much use to lay readers. There is a notable misprint on p. 223 where the name of the famous biological-psychologist, Lloyd Morgan, is spelt Lord Morgan!

Annual Reports.

ANNUAL REPORT OF THE DIRECTOR OF PUBLIC HEALTH AND OF THE SANITARY ENGINEER, MADRAS, FOR THE YEAR 1924. MADRAS: SUPDT., GOVT. PRINTING 1925. PRICE RE 1-4-0.

MAJOR A. J. H. RUSSELL, M.D., D.P.H., I.M.S., continues in this report his most interesting series of annual reports, dealing with many important problems of public health, not peculiar to Madras, but of general interest in India. Thus he notes that the registration of vital statistics is as bad as ever; in 23 districts a total of 63,783 unregistered births was discovered. A proposal was made that the work of registration in union areas should be transferred to the Union Boards, but was not accepted by them. Official orders have now been issued that the compilation work of vital statistics shall in future be carried out in the Collector's office under supervision of the District Health Officer, whilst the simplification of the district monthly returns is under consideration and amendment of the Village Officers' Manual.

The birth rate of the Presidency shewed a definite rise, from 33.1 in 1923 to 34.9 in 1924; but the death rate also rose, from 22.2 to 24.5, and infantile mortality shewed 179.2 deaths per mille of registered births.

The district health staff, organised in 1923, continued to work during 1924. The most noticeable features of

the year were the large increase in cholera mortality and the considerable decrease in the mortality from plague. The cholera mortality, 51,971 deaths, was the highest recorded since 1918; the plague mortality, 3,922 deaths, one of the lowest figures ever recorded in Madras.

Cholera.—All districts in the Presidency except five were infected during the year, and the total death rate from cholera rose to 1.3 as against an average figure of 0.9 for the previous quinquennial average. Drought, famine and unfavourable climatic conditions favoured the spread of the disease, also the absence of protected water-supplies in many municipalities. Floods in several other districts also contributed to an increase of cholera. Thus the breaching of the banks of the Cauvery river damaged the water-supply of Trichinopoly town and was immediately followed by a severe outbreak of cholera with 1,507 deaths. Major Russell comments on the relative ease with which a single outbreak, notified early, can be dealt with; conditions are far otherwise when the disease suddenly becomes epidemic simultaneously in several different areas. A feature of the year was the increased willingness of the populace concerned to help in preventive measures; in one district over 5,000 contacts were inoculated with anti-cholera vaccine, only 4 of whom died,—all probably infected prior to inoculation. In order to improve and standardise preventive measures amended instructions have been issued and Horrock's box for chlorination of water-supplies has been supplied to a large number of local bodies.

A careful study of cholera incidence in the Presidency for the past 30 years shews that there is a definite six-yearly cycle, which holds good for every district in the Presidency. At least it may be claimed that the new district health staff have now a thorough knowledge of the main foci of infection and the routes of spread of the disease, and that such knowledge will be the basis for better devised and more efficient preventive measures.

Small-pox.—The history of the year bears out the contention of every Director of Public Health in India as to the vital need for more active measures. The death rate from the disease was 0.4 as against a quinquennial average of 0.5 per mille, but nearly two-thirds of the deaths occurred in seven districts. Here preventive measures were obviously lax. Over 75 per cent. of the mortality occurred among children under ten years of age, and 40 per cent. in children under one year; thus indicating the extent to which the child population is still unprotected. The disease tends to recur in Madras in 6 to 9 year cycles and the mortality usually reaches its maximum in March.

Plague shewed a notable decline, a death rate of 0.1 per mille as against a quinquennial average of 0.3. Salem, Coimbatore and Madura constitute the danger foci, whilst Hyderabad was virulently infected during the latter half of the year. A general review of the plague centres in the Presidency would seem to indicate that, if efficient preventive measures were taken in the towns, the control of plague would be very much simplified. Infection ordinarily commences in the market and grain-store areas, and if anti-plague funds were devoted to improvements in these places, the main sources of plague would be removed. Rat-trapping and poisoning are carried out only half-heartedly. "There is only one way to eliminate the rat; it must be built out of existence. The rat-proofing of new structures is relatively inexpensive, but the cost of rat-proofing old buildings is very considerable."

Fever.—The total mortality was 7.9 per mille, with a total of 322,356 deaths. The Nilgiris, contrary to all previous experience, shewed an abnormally high death rate, no less than 20.6 per mille; this was due to epidemic relapsing fever. Thanks to a vigorous campaign carried out by the Ootacamund Municipal Council and the Nilgiri District Board the epidemic was stamped out. The position with regard to malaria is being gradually cleared up; the anti-malarial unit attached to

the King Institute, Guindy, spent the year in carrying out surveys, whilst as a result of their activities and of those of the new district health staff accurate information is being collected. Funds however are very low, and it is most unfortunate that the second anti-malarial unit was disbanded as a measure of supposed "retrenchment"; the work of this unit had already probably saved government some twenty times its small cost of running. In some of the severely infected endemic areas a policy of free distribution of quinine wholesale seems to be the only policy possible, until the conditions present have been more fully investigated, and until funds for better directed measures are available.

A great contraction took place during the year in the area known to be infected with relapsing fever. Generally speaking, with the exception of the outbreak in the Nilgiris, the outbreaks were confined to small areas and were quickly stamped out. The experience with regard to this disease appears to bear out the statement in medical literature that epidemics usually die out after two years.

The incidence of dysentery and diarrhoea shewed a rise,—probably associated with the cholera epidemic, but the information at present available is not accurate enough for inferences to be drawn. Respiratory diseases gave a total mortality rate of 1.6 per mille, and probably much tuberculosis is concealed within this figure. Again the information is not accurate enough.

Hookworm disease.—The ankylostomiasis campaign was vigorously pushed during the year. The infection is ubiquitous throughout the Presidency; infection rates determined ranging from 55 to 90 per cent. No less than 123,100 treatments were administered, over 4,500 lectures given and much propaganda work carried out. The Rockefeller Foundation continued its work in this connection throughout the year.

Propaganda.—The need for the extension of maternity relief is shewn by the fact that it is estimated that in only some 43 per mille of cases of childbirth was skilled medical attendance available. The National Health and Baby Week was very successful. During the year 33,846 lectures were delivered at 27,346 centres, and during the special week an intensive campaign was carried out throughout the Presidency with the aid of lectures, leaflets, posters, lantern demonstrations and health exhibitions. The success of this branch of public health work is in no small measure due to the co-operation of such voluntary agencies as the Madras Health Council, the Rockefeller Foundation and the Red Cross Society. An annual grant of Rs. 8,000 for propaganda purposes has been given to the first named of these bodies.

Fairs and festivals.—Prior to the inauguration of the new district health scheme in April 1923, the arrangements made by local bodies to deal with the sanitation of fairs and festivals were totally inadequate. The value of the work of the district health staff in 1924 is shewn by the statement that "although practically every district in the Presidency was affected with cholera during the year, the great majority of festivals passed off without untoward incident." During the last two years conferences have been held in most districts concerned, attended by representatives of the local bodies, temple and railway authorities and departments concerned. The sources of income to local bodies from such fairs and festivals is not inconsiderable, and such income should be freely expended in public health measures.

Administration.—The reorganisation of the duties of the Assistant Directors of Public Health has tended to increase their usefulness and efficiency and to reduce the expenditure involved in administration to a minimum. In order to extend the health scheme to municipal areas, government provincialised the service of municipal health officers and included 11 posts of municipal health officers in the provincial cadre.

"The Government have read with interest Major Russell's full and illuminating report" runs the covering Government resolution, "and congratulate Dr. K. T.

Matthew, who acted as Director of Public Health during Major Russell's absence on leave during the year and the Assistant Directors of Public Health on the successful administration of the department."

REPORT ON VACCINATION IN THE MADRAS PRESIDENCY FOR THE YEAR 1924-25. BY MAJOR A. J. H. RUSSELL, M.D., D.P.H., I.M.S., DIRECTOR OF PUBLIC HEALTH, MADRAS, 1925: MADRAS: SUPERINTENDENT, GOVT. PRINTING. PRICE 8 ANNAS.

THE progress of vaccination in the Madras Presidency is indicated in this report by the facts that (a) the total number of operations exceeded two millions, an increase of 121,432 over the previous year; (b) the total number of successful cases reached a percentage of 83.7 as compared with 81.7 in the previous year and 69.6 in 1920-21; (c) successful infantile vaccinations increased in number by 79,327; (d) the cost per successful case worked out at 5 annas 9 pies as against 8 annas 9 pies in 1923-24; whilst (e) the total number of deaths from small-pox, 20,227 was 2,000 less than in the previous year.

During the three to four hottest months of the year vaccination was again suspended throughout the Presidency except in the Nilgiri district and Kodaikanal municipality; the period of suspension being utilized for the detection of unregistered births and of unprotected children. In one district, Tanjore, nearly 19,000 unprotected children were detected during the year, a fact very creditable to the district health staff, but very discreditable to the registrars responsible. Yet, despite the obvious fact that the services of vaccinators can be most usefully employed on this task during the hot weather off-season months, many local bodies either grant leave to vaccinators during this season, or dispense with their services, or utilise them for other work not bearing on vaccination.

In general Major Russell attributes to the following causes the retardation of vaccination in the province:—(a) the failure to introduce compulsory vaccination, especially in rural areas; (b) the reluctance of local bodies to enforce the provisions of law relating to compulsion; (c) the failure of local revenue officers to report promptly cases of small-pox and to correctly maintain the registers of vital statistics; (d) the failure on the part of many local bodies to employ an adequate and duly qualified staff of vaccinators; (e) the absence, especially in municipalities, of adequate supervision over the work of vaccinators; and (f) the activities, though limited at present, of the anti-vaccinationists.

Of the districts, 17 shewed an increase in the number of operations performed, and 8 a decrease. In municipalities there was an increase of 53,463 operations, Madras shewing an increase of 40,361. It is to be noted that, whereas a decrease in the number of operations is an obvious sign of slackness, the fact that there has been an increase is not always a sign of real improvement; in many cases such an increase may be due to actual or threatened outbreaks of small-pox. The maximum rate of successful cases per mille of population in municipalities was 153 at Ongole, the minimum 20.2 in Tiruvalur. The percentage of success was highest in municipal areas, 97.5, against 94.3 in local fund areas, and 91.8 in the (Government) Agency tracts. The lower percentages in the last two areas are due partly to the deterioration of the lymph in transit, and partly to delay in its use.

The Nandyal Taluk Board in Kurnool district is singled out as a good example of how *not* to do things; the district health officer reports that, despite the prevalence of small-pox in this locality, the Board has refused to declare vaccination compulsory, has refused to increase its permanent vaccination staff—which now consists of one vaccinator only, whilst it has also declined even to employ additional temporary staff.

As with public health in general, so with regard to vaccination, the introduction in 1923 of the district health board scheme has greatly improved matters. For

the first time on record the total number of vaccinations passed the figure of two millions, whilst the success rate for primary vaccinations reached the high figure of 94.6 per cent. The progress is bound to continue, although vaccination is still very backward in certain areas.

Capt. N. R. Ubhaya held the office of Assistant Director of Public Health (Vaccination) until July, when he proceeded on study leave. From that date Dr. P. Adiseshan, D.P.H. (Cantab.), was in charge. The improvement noted during the year is largely due to the energy and ability of both these officials.

ANNUAL PUBLIC HEALTH REPORT FOR THE YEAR 1924. CENTRAL PROVINCES AND BERAR. BY LIEUT.-COLONEL H. G. STILES-WEBB, D.P.H., D.T.M. & H. (CAMB.), OFFICIATING DIRECTOR OF PUBLIC HEALTH, 1925. NAGPUR: GOVERNMENT PRESS. PRICE RE. 1.

BOTH the climatic and economic conditions of the year were favourable to health. The rainfall distribution was satisfactory, crops well up to the average, no deficiency of food stuffs, whilst prices remained steady. In consequence the year was a healthy one and there was no widespread epidemic disease. These favourable conditions are reflected in the birth rate, 44.18 per mille, which was 5.62 above the quinquennial average; the death rate of 32.59 per mille, a figure 4.85 below the quinquennial average; and an excess of births over deaths of 11.59 per mille.

Yet the position is not as roseate as it sounds. "Owing to the action of the Legislative Council in refusing to vote any of the demands in the budget for 1924-25," runs the covering Government resolution, "the programme of sanitary schemes continued to be restricted during the year....Recurring grants of Rs. 40,598 for sanitary works were made....Of the total income of municipal towns in this province, 34 per cent. was spent on public health purposes, as compared with 38 per cent. in 1923, 46 per cent. in 1922, and 50 per cent. in 1921. The decreasing interest displayed by local bodies in public health measures is regrettable. Moreover the Director of Public Health reports that want of co-operation between the officers of the municipal committees and the executive officers of Government has led to considerable delay in the development of sanitary schemes in some towns. The local bodies would do well to realise that neither education nor medical relief nor any other public activity can flourish amidst squalid and unhealthy surroundings." Non-co-operation may be an ideal in a Utopia where there is no disease; in a province with the highest infantile mortality in India it is a disaster.

The infantile mortality during the year in the province was 235 per mille of living births, as compared with corresponding figures of 212 for the Punjab, 198 for the United Provinces, 184 for Bengal, and 78 for England and Wales. Some 52 per cent. of the total mortality in the province occurs among children under five years of age; one child in every three dies within its first year of life, one in every eleven within the first week of life. If the true meaning of such figures could only be driven home to the voting public, one might see a welcome revolution in public health matters in India. That strenuous efforts are made, no one can deny; but "any sustained advance in public health is dependent more on the activities of members of the public than on the introduction of new schemes by any department of Government." National Baby Week was held in some 40 municipalities during the third week in January and was very successful, but the holding of such an annual week is not enough; it should be followed up by the establishment of child-welfare centres in all the larger municipalities. In Nagpur the child-welfare centres already have a record of useful work to their credit. The infant mortality among 1,902 babies visited by the health visitors was 118 per mille, as against a figure of 182 per mille for 3,818 unvisited

babies; shewing an approximate saving of 70 lives per mille as the result of this activity. In other districts matters are also improving; in Jubbulpore there is one female assistant medical officer with four trained *dhais* in charge of the work, and 3,083 visits were paid. In Hoshangabad the hospital midwife visited 562 babies out of 568 births. In Saugor classes for *dhais* are held; whilst the Raipur municipal committee has decided to open a permanent child-welfare centre. In other municipalities, however, councillors are willing to fall into line, but are waiting for the hoped-for grant from the provincial government before commencing operations.

In an interesting analysis of the causes of this very high infant mortality, Colonel Stiles-Webb gives two fundamental factors as the causes; (a) ignorance of the principles of motherhood. This can only be dealt with by education, especially by the establishment of permanent child-welfare centres and the employment of health visitors, and in this connection he pleads that Indian ladies of standing will come forward with their very great influence and lend a hand; and (b) insanitation in all its forms, the alleviation of which forms the first duty of the Public Health Department, and which can be chiefly combated by the provision of pure water-supplies and of effectual surface drainage.

With regard to death rates in general, that for Mahomedans, 36.62 per mille, is very markedly above that for Hindus, 27.10 per mille, and this is attributed to the effects of the purdah system. The urban death rate, 37.29,—as usual—was greater than that for rural areas, 32.29. The town of Nandura in Buldana district reported the amazing death rate of 61.64 per mille,—partly at least attributable to plague.

Registration of vital statistics continues to be bad; apathy and indifference still prevail in most of the municipalities, where the committees take no interest at all in this important work. The matter is left entirely to the subordinate staff whose work is never checked. The practice of copying entries from each other's registers by the police and municipalities is always indulged in, and no steps are taken to check defaulters.

Of the chief causes of mortality, "fevers" heads the list with a mortality of 17.32 per mille; next come respiratory diseases, 2.67; dysentery and diarrhoea, 2.33; plague, 0.80; cholera, 0.70; and injuries, 0.47, a high figure due to the wild and jungly character of much of the country concerned.

Cholera.—The disease shewed a distinct increase on the figures for 1923; with 9,704 deaths, of which 2,964 occurred in August. (It is to be noted from the reports of the provincial Directors of Public Health concerned, that the year 1924 saw a distinct extension and increase of cholera from Eastern Bengal into Bihar and Orissa, the Central Provinces, and—via Kashmir—into the Punjab. The 1924 figures for the United Provinces have not come to hand, but, as our readers will recall, Colonel Gill has recently raised the very important question in our columns as to whether this may not represent the commencement of another world-wide pandemic, commencing—as usual—in Eastern Bengal, and possibly extending, as it has previously done, to the banks of the Mississippi). In the Central Provinces in that year Chanda was first infected by pilgrims returning in March from Benares. Buldana and Akola districts were also cholera centres during the year.

Vigorous anti-cholera measures were taken, and inoculation is gaining in popularity, as many as 8,887 persons having been inoculated during the year. Reports as to the different value of the essential oils' mixture, kaolin, and other lines of treatment give rather conflicting evidence. With regard to anti-cholera vaccine Colonel Stiles-Webb advocates a single dose of 1½ c.c. for an adult, or 1 c.c. for a child, in place of the usual two doses with a ten day interval.

Fevers.—Deaths from fevers numbered 240,944, but the only district to report severe epidemic malaria was Chanda. The Central Jail, Nagpur issued 91 lbs. more quinine than in the previous year, whilst the official price for quinine sulphate was reduced from Rs. 27 to

Rs. 24 per lb. The issue of cinchona febrifuge in place of quinine has been considered; but the former is not considered satisfactory as it is not standardised; a limited issue for experimental trial is being made to government departments only. Influenza of mild type was reported from many districts, but relapsing fever was almost completely absent,—only two cases having been reported. "Tick-typhus" occurred during the military manœuvres near Saugor.

Plague constituted the chief epidemic disease of importance during the year, the deaths totalling 11,081 as against 15,867 in 1923, and the infection being widespread. In Jubbulpore city a special advisory committee was formed, isolation hospitals opened, health camps organised, and inoculation centres established. A vigorous anti-rat campaign was started in August, and the epidemic which broke out in Meloniganj ward made only very slow progress during the rest of the year; the measures taken being almost sufficient to hold it in check.

No less than 54,305 persons were inoculated against plague during the year, and inoculation is now readily resorted to by the people in the presence of an epidemic. In Nagpur town a vigorous anti-rat campaign was carried out, and although plague was prevalent in several localities near the town, and four cases—3 imported and 1 indigenous—were reported within the town, yet the disease did not spread. The Deputy Commissioner writes that he considers that the anti-rat campaign saved the town. In Amraoti also a vigorous anti-rat campaign was carried on; "it is striking to compare Takarheda, a village of 1,628 souls with 262 attacks in three months, with Amraoti city with its population of 37,568 with only 153 attacks in three and a half months in the latter half of the year when plague broke out afresh in each place," writes the Civil Surgeon. In many other centres rat destruction was resorted to more or less vigorously.

"The concrete example of Nagpur," writes Colonel Stiles-Webb, "clearly shews that if a rat destruction campaign is to have any material effect in preventing plague outbreaks in towns, it must be systematic, vigorous and continuous. Hap-hazard methods not only are ineffective, but bring the whole system into disrepute Municipal committees must adopt a definite scheme on approved lines and continue it through the year for at least three or five years."

There were 31 epidemic travelling dispensaries at work in the province during the year; they visited 4,511 villages and treated 60,093 patients. When not engaged in dealing with epidemics, the staff of these travelling dispensaries is employed in public health propaganda work, inspection of schools and villages, and checking vital statistics. "They are doing useful work and are popular" writes Colonel Stiles-Webb.

Rabies.—Anti-rabic treatment centres were opened during the year at the Mayo Hospital, Nagpur and the Victoria Hospital, Jubbulpore. Of 355 dog-bite cases, it is reported that 306 were sent for anti-rabic treatment, of whom one died, 6 cannot be traced, and the 299 remain well and fit.

Leprosy.—Two hundred and fifty-eight patients were treated at the government and mission hospitals during the year; and an additional 174 patients at the Chandkhuri asylum by a special course prescribed by the Calcutta School of Tropical Medicine, consisting of injections of the esters of hydnocarpus oil and the use of chaulmoogra oil both externally and orally. A grant of Rs. 26,000 has been given to the asylum at Dhamtari to provide additional accommodation. Of reports by different superintendents:—The Superintendent at Dhamtari has been using "E. C. C. O." and "E. T. O."; but reports no definite results; the Superintendent at Mungeli reports satisfactory results in the treatment of 38 patients with sodium morrhuate; the Superintendent at Champa, using the ethyl esters of hydnocarpus oil, says that the results are most gratifying. The Civil Surgeon, Akola, reporting on the treatment of 71 cases, mostly of nerve type, with

"E. C. C. O." and hydnocarpates says that no improvement has been noted. "One tubercular case has been under treatment for about 18 months, but his condition is unaltered. He is an only son, and as his father is most anxious for his cure, he has attended regularly for treatment."

The sections on municipal and rural sanitation in this report make doleful reading. In Drug town the municipal area has not been cleared from rubbish, nor has disinfection of latrines, drains and cesspools been carried out satisfactorily, while the municipal committees have not been able to prepare a workable scheme for the improvement of the water-supply. With regard to Khurai and Deori, the Deputy Commissioner remarks "these municipalities are entirely apathetic in everything connected with improvements in sanitation, and so far as one can see, will continue to remain so until a miracle occurs by which the electors and their representatives begin to take a live interest in the welfare of the areas committed to their charge." In Wun town the inhabitants were driven to complain of the grossly insanitary state of the town during the last cholera epidemic, but it remains *in statu quo*. Of Akola town the Deputy Commissioner writes, "I consider the sanitation of Akola town is not quite so bad as it was last year, but it is still in a condition of which any other municipality might well be ashamed." In Jubbul-pore town a most remarkable economy has been effected whereby the sanitary staff have been set to work to do the tax-collecting in addition to their own duties, a development which is likely to lead to the failure of both undertakings.

One very satisfactory feature of the report is its account of the useful volume of work done in the medical inspection of schools throughout the province. In municipal areas 56,037 children were inspected, and 53,594 children in rural areas. Steps are taken to discover unvaccinated children, report on the spleen rates, discover physical defects and to advise teachers and parents. Finally very active health propaganda work is being carried on. The two Health Publicity officers appointed in 1922 visited many municipal centres and delivered some 200 lectures; the Health Publicity scheme has now been made a permanent one, and the two present officers, Drs. Mehta and Mangrulkar have been confirmed in their appointments.

Colonel Stiles-Webb's report is one of great interest. It should be added that the office of Director of Public Health, C. P., was held during the year 1924 by Lieutenant-Colonel T. G. N. Stokes, M.N., I.M.S., and that the report is compiled from his records and notes.

MUNICIPALITY OF COLOMBO. REPORT OF THE MEDICAL OFFICER OF HEALTH FOR THE YEAR 1924. MUNICIPAL PRINTING OFFICE, COLOMBO.

SITUATED as it is in a tropical and almost Indian climate, and being the centre of the Eastern maritime trade, the annual health reports of Colombo are always interesting reading. The report for 1924, by Dr. W. Marshall Philip, profusely illustrated and full of interesting matter, is no exception to the rule.

The year was exceptionally wet, with a total rainfall of 122 inches, some 40 inches above normal, whilst the mean average temperature for the year was 81° F. The estimated population was 253,226, or if the correction considered necessary by the census officer be considered, probably about 280,000. Singhalese predominate,—118,854,—but the population is a very mixed one, containing large elements of Tamils, Moors and Malayas, with some 3,000 Europeans. The birth rate was 27.2 per mille, a figure considerably above the decennial average of 26.4. The Malay birth rate has shewn a remarkable increase of recent years, probably due to better registration among this community, and the registering of all births resulting from intermarriage of Malay with other races as Malay children.

The death rate was 29.3 per mille,—or if checked by the correction for the census figures, 24 per mille. In all 7,429 deaths were registered, of which 1,107 were

due to pneumonia and bronchitis, 801 to dysentery and diarrhoea, no less than 722 to tuberculosis, and 316 to enteric and continued fevers. Owing to the exceptional care with which the Colombo figures are gathered, one concludes that this represents approximately the conditions prevalent in a large seaport in the tropics, and the tremendous incidence of tuberculosis will not be passed by without remark. The Malays shewed the greatest death rate, 35.3, but this is probably an exaggeration, as many pseudo-Malays are included; on the other hand the low figure of 12.9 for the European community is certainly too low, as many when mortally sick proceed home to die, and owing to retirement in middle age.

The infantile mortality was 239 per mille of live births, as compared with a decennial average of 254. Deaths from tetanus neonatorum have shewn a remarkable decline from 28 per mille in 1908-12 to 3 per mille in 1918-22,—the war years, as being exceptional, being excluded. On the other hand the deaths from congenital syphilis have shewn a corresponding increase from 3 to 5 per mille. The former decline must be attributed to child-welfare and ante-natal measures; there are 11 municipal health visitors and 7 municipal midwives, also a government lying-in home, a hospital for women, a hospital for sick children, three free milk depôts, and a small creche. The question of establishing an up-to-date child-welfare centre is receiving attention.

Of the principal diseases, the incidence of pneumonia has shewn a slight but definite decrease on the previous year. Phthisis is rampant, and a most serious problem; "the population, not only of Colombo, but of the whole island, is very heavily infected," the average death rate in Colombo for 1924 being 2.69 per mille. A very informative spot map shews the exact correlation between phthisis incidence, overcrowding and slum areas. There are government isolation hospitals for small-pox, writes Dr. Philip, but for this far more terrible scourge a single hospital with accommodation for 350 patients is all that is available; at least double such accommodation is required. (In Calcutta the available accommodation is about 25 beds).

Cholera is not endemic in the island and only one imported case occurred. Enteric fever is mainly of a mild type, and many non-fatal cases must escape notification, to constitute further infective foci. Small-pox is almost negligible, 9 cases during the year, of which several were imported; 6,887 births were recorded during the year with 5,784 primary vaccinations and 1,398 re-vaccinations,—a very satisfactory state of affairs.

Plague however constituted a serious question during the year,—148 cases with 140 deaths having occurred. For the first time in the history of plague in Colombo primary pneumonic plague appeared, fortunately limited to a series of seven cases. Vigorous measures were taken and the outbreak promptly subsided, but its occurrence is not without significance, and a special and detailed report by Dr. Aserappa is appended. A total of 137,406 rats were killed during the year, and 29,429 of them examined, which shewed a plague incidence of 0.29 per cent.

Malaria is not a very important problem in Colombo, 1,627 cases having been treated during the year, and 77 deaths from malaria having been reported. Legislation rendering the breeding of mosquitoes a statutory offence has been refused, however, and preventive work is much handicapped; epidemic conditions prevail from time to time and the possibility of severe epidemics cannot be negated.

Administration.—Food inspection is still in an unsatisfactory state, and the appointment of a whole-time food inspector for the town is urgently needed. There were 46 dairies registered at the end of the year, but the majority of them are unsatisfactory. The Colombo Ladies' League offer prizes for the best run dairies, with the result that newly registered concerns begin well, but end badly, although they still continue to shew their certificates of merit. The apathy of the

public and the existence of numerous unlicensed vendors are largely to blame. Some idea of the activities of the public health staff in this connection may be gained from noting the fact that 29 licensed vendors were prosecuted during the year, all successfully, as the result of 1,051 inspections made; whilst 224 unlicensed vendors were prosecuted and 214 of them convicted. The unlicensed vendors constitute a particularly difficult problem; the licensed vendors have more or less to conform to sanitary rules; the unlicensed ones take refuge in the compounds of Europeans and others who wish to obtain a cheap milk supply and evade all rules. A useful list of registered dairies and vendors, on p. 35 of the report, should go far to check this abuse.

Bakeries are more satisfactory than dairies on the whole, and better run. Here again a list of registered bakeries is given for general information. There has been a general improvement in the standard of eating-houses, as the result of frequent inspections, whilst the condition of the aerated water factories is on the whole satisfactory.

The question of the ice supply was bacteriologically investigated during the year by Dr. L. F. Hirst, Municipal Bacteriologist, and his special report on pp. 72 and 73 is of general interest, and applicable to Indian conditions. Three factories were investigated, all of which use the filtered town water-supply. In general it may be said that the ice is manufactured under entirely suitable conditions, is handled only mechanically until it is loaded into the delivery vans, and up to this stage is bacteriologically satisfactory. During the process of retail distribution, however, gross contamination may occur, and the chief source of contamination is the commercial sawdust in which the ice is packed for transport. Bacteriological examination of the sawdust gave counts exceeding 100 million organisms in 3 gms., and it is apparent that some species of lactose-fermentors are capable of rapid multiplication in damp moist sawdust. It is difficult to provide a substitute for sawdust; asbestos wool has been tried but is not commercially practicable. For the present, it may be said that the ice as it leaves the factories is bacteriologically satisfactory, but it must be most carefully washed free from all traces of adherent sawdust before it is safe to use, whilst ice-boxes containing sawdust require special attention. Contrary to popular belief, experiments shew that the addition of whisky to the iced soda does not inhibit the bacteria.

(This problem is one of considerable importance in every large Indian city, and conditions are presumably analogous to those in Colombo. The reviewer recalls in 1908 seeing large blocks of ice covered with sawdust being brought into a hotel in Poona at lunch time; they were washed, it is true, but in the most filthy water imaginable standing stagnant in a tank in the hotel garden. The moral is that ice must be thoroughly washed with cold boiled water before use. The Colombo report does not mention the use of blankets for wrapping ice, but the reviewer can recall an instance where some of the coolies at an ice factory used the blankets used to wrap up the ice for warming cholera patients among the personnel concerned.)

Dispensaries.—The four free municipal dispensaries continued to do good work among the poor; the numbers treated being 19,266 at the Slave Island dispensary, 17,073 at St. Paul's dispensary, 11,755 at Maradana dispensary, and 13,071 at Modera dispensary.

Housing.—Only minor improvements were carried out during the year, but a special report on the slum areas in Colombo was presented to government. "This is not a report upon infant mortality," writes Dr. Philip at the end of his special report, "but one cannot refrain from mentioning overcrowding in the slum areas as being one of the most important factors responsible for the set-back which has occurred during the last few years in the previously steady decline in the infant mortality in the town as a whole.....I would urge the paramount importance of measures being adopted at

the earliest possible moment to increase the housing accommodation for the poorer classes who now reside in these grossly overcrowded slum areas." And maps shewing the close correlation between slums, overcrowding and infant mortality lend point to the appeal.

Report of the Municipal Bacteriologist.

Annexure A to the report is the report by the Municipal Bacteriologist, Dr. L. F. Hirst, M.D., whose work is not unfamiliar to our readers. It is a special report full of interest to the laboratory and research worker.

In the way of general routine work 1,296 clinical specimens were examined, and a gross total of 37,964 specimens in general public health bacteriology; of 29,429 rats examined 87 proved to be plague infected. In connection with the previously mentioned outbreak of pneumonic plague *B. pestis* was obtained in pure culture from the sputum of one patient, and from lung juice drawn at post-mortem on a second. The evidence goes to shew that transition of bubonic plague to pneumonic plague may occur through the agency of a bubonic case which develops secondary pneumonia. The pneumonic cases appeared during the hot weather, a striking anomaly in the light of general experience in other countries. The sputum of a typical case of septicæmic plague in Colombo contains abundant plague bacilli, but climatic conditions in the tropics are usually unfavourable to their survival outside the human host.

On the afternoon of the 8th November, 1924 a social gathering was held at the Post Office Sports Club, where a variety of refreshments was served. During the following 24 hours no less than 77 of those who had attended this fell ill with severe gastro-intestinal symptoms, but fortunately all recovered. The only article of diet partaken of by all was the ice-cream, but none of the original sample which was suspected was available for examination. Thirteen other specimens from the refreshments used gave negative results; whilst the faeces of the four individuals who had taken part in the preparation of the ice-cream also gave negative results.

The faeces of one of the patients, however, yielded a culture of *B. artrycke*; and three mice fed with this organism died of gastro-enteritis, the same organism being recovered from their stools. Sera were obtained from 8 of the convalescent patients and agglutinated *B. artrycke* (Lister Institute strain) at titres up to 1 in 1,200 and the locally isolated organism in titres up to 1 in 1,000. (As Dr. Hirst remarks in passing, it is to be noted in this connection that recently isolated strains do not usually exhibit full agglutinability, as is also the case with the Flexner group of dysentery bacilli). The outbreak therefore was clearly due to *B. artrycke*, and instances are quoted of other similar outbreaks from the literature. It is to be noted that flies were very troublesome in the house where the ice-cream was prepared.

On the veterinary side, Dr. Hirst gave evidence before a committee appointed to enquire into the spread of rinderpest in Ceylon, and pleaded for the extended use of the double inoculation method for the immunisation of susceptible cattle. In February an outbreak of infectious pneumonia occurred among a consignment of goats imported from Karachi, and a pasteurilla organism was isolated.

The main portion of Dr. Hirst's report deals in detail with his researches on the spread of plague in Colombo, and is a section that we trust will later see wider publicity than in the columns of an annual report. This work was commenced some years ago, and followed on the finding of *Xenopsylla cheopis*, the plague-carrying flea in Colombo rats, first in 1914. The two species of rat prevalent in Colombo are *R. rattus* and *R. norvegicus*, the former being the more important. A systematic collection of rat fleas was made during the plague season from different areas in the town. The statistical results, analysed by mathematical methods, shew that there is the closest possible correlation between the regional

incidence of human plague in the different quarters of the city, and that of *X. cheopis*. In the old system of Dutch drains beneath the endemic area probably *R. norvegicus* predominates, and here temperature and humidity conditions are probably more favourable than elsewhere in the city for the survival of infected *X. cheopis*; further Dr. Hirst has found the same flea on the "musk-rat," *Pachyura carulea*, a known reservoir of plague-fleas in French Indo-China.

Summarising the results of his researches into the question since 1915, Dr. Hirst reports:—

(1) Attempts to carry plague from rodent to rodent with *X. astia* at room temperature during the plague season gave negative results.

(2) Similar attempts with *X. cheopis* were successful.

(3) Further, plague has been transmitted from rat to rat by *X. astia* in one experiment carried out under artificially reduced temperature; and *X. astia* has been found to behave as a "blocked" flea. It is comparatively easy to obtain a heavy growth of plague bacilli in *X. astia* fed upon infected rats, but these blocked fleas have a low vitality and bite rats but feebly at tropical temperatures.

(4) At room temperature during March, under climatic conditions particularly unfavourable to plague transmission to man, the infection could nevertheless be continuously transmitted from rat to rat by *X. cheopis*.

(5) As regards the relative virulence of plague bacilli in the stomach of *X. astia* and *X. cheopis*, there seems to be no difference.

Finally, in conclusion, both species appear capable of plague transmission. But under such tropical conditions as are encountered in India and Ceylon, *X. cheopis* is the more efficient and important vector of the infection.

Where does the *X. cheopis* come from, seeing that its occurrence in Colombo was first noted in 1914? The answer is that it is probably an imported flea, developing chiefly in the vicinity of grain stores, and possibly assisted in its development and distribution by the presence of the old Dutch underground drains in the endemic area. In outlying districts of the town, non-infected, the *cheopis* constitute only some 1 or 2 per cent. of the rat fleas present; in the grain-store areas its percentage rises to 50 to 70 per cent, and during an epizootic of plague among the rats to 80.3 per cent.

The endemic plague area in the town itself is not particularly congested, and is relatively free from enteric fever and other intestinal disorders due to insanitary conditions. As in India, the association between plague prevalence and housing conditions is indirect. Further investigation is called for; but it is to be noted that plague reached Rangoon in 1905, but it was not transferred to Colombo till 1914. The rainfall during this interval was deficient and climatic conditions probably unsuitable for the transference of *X. cheopis* to Ceylon and Southern India.

By way of remedies, disinfection of imported grain has been suggested. "Before *X. cheopis* appeared the amount of grain stored in the endemic area was many times greater than at the present time. No improvements had been carried out in the method of grain storage. The whole endemic area must have swarmed with rats. Yet there was no plague. . . . Since 1915 the whole of the rice has been withdrawn from the endemic area and stored in government granaries. Many of the private stores have been much improved, and a vigorous anti-rat campaign is continually prosecuted in the endemic area. Yet plague recurs each year. . . . The grain has been removed from the vicinity of Sea Street. . . . Plague and *X. cheopis* remain; probably they will continue to do so till underground communication with the adjoining district is cut off."

The report also records the result of certain preliminary experiments to determine the relative viability and biting proclivities of male and female fleas of the two species. The whole of this section of Dr. Hirst's report is full of interest; it should be read in the original by all interested in experimental work on plague transmission.

Annexure B to the report is by Mr. Alexander Bruce, the City Analyst. The milk supply is still unsatisfactory; nearly 40 per cent. of 938 samples tested were found to be adulterated, the maximum adulteration being 76 per cent. Experiments are in progress directed to ridding the water-supply of dissolved iron and to aerate it after filtration. The supply on the whole however is satisfactory.

Correspondence.

FITZSIMONS' ANTIVENOMOUS SERUM.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Since the publication of my notes on the treatment of cobra bite with Fitzsimons' antivenomous serum, I have been receiving numerous enquiries as to where this serum can be had. As it is impossible to reply individually to so many letters, I would be much obliged to you, if you will kindly inform the readers of the Gazette that, though we obtained our supply of the serum from Messrs. Smith, Stanistreet & Co. of Calcutta, it is at present not available in India.

The serum can be obtained direct from the manufacturer, Mr. F. W. Fitzsimons, Director, "Snake Park," Port Elizabeth, South Africa. I have written to Mr. Fitzsimons to arrange that it may be easily available in India.—Yours, etc.,

A. C. BHARADWAJ, L.M.P.,

House Surgeon, King Edward VII Hospital

BENARES,

22nd December, 1925.

IODOFORM POISONING.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Gaya Prasad, aged 40. Hindu male, Kayisth by caste, of Sambhanli Station, E. I. Railway, was brought to my dispensary in a very miserable plight. He had a big ulcer in his left leg and a large area of acute eczema and pustulation around it. Pus was running from the sore, like water from a spring, and the whole leg was swollen from the knee to the toes. There was a similar ulcer on the lobe of the left ear, with similar features. The face was swollen and the left eye closed with swelling. Fever was also present.

On questioning the man, he said that a month previously he had been advised to use iodoform for a small ulcer on his left leg, also for some local irritation in the left ear. As the result of indiscriminate use of iodoform, in a month's time the patient had developed the condition described.

I gave both lesions a thorough washing with Condy's lotion and applied lint soaked in a lotion of potassium permanganate, zinc oxide and lead, but to no avail. Next day I scraped the ulcer on the leg, washed it thoroughly with saline, and bandaged the affected parts with an ointment of calomel, zinc oxide, boric acid, camphor, sulphur and vaseline. Diuretics and diaphoretics were given, and twenty days later the patient was discharged cured.

My object in writing to you is to draw attention to the dangerous and indiscriminate use of iodoform by itinerant quacks, who get hold of English medicines and use them freely without any knowledge of their dosage or proper use.—Yours, etc.,

HARDEO SINGH, L.M.P.,

GARHURGETER DISPENSARY,

MEERUT DISTRICT.

22nd December, 1925.

THE PRICE OF SANTONIN.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—Comment was made in a recent issue of your journal on the price of santonin. Your readers will be interested to know, that we have recently announced a substantial reduction in the price of this well-known drug. Our reduced price for wholesale quantities is equivalent to about 29s. 9d. per oz., or about 1d. per grain. Our new scale of prices and a full explanation have appeared in the *Chemist and Druggist* of November 28th and December 5th 1925.—Yours, etc.,

THE EASTERN & RUSSIAN TRADING
CO., LTD.

LONDON,
17th December, 1925.

ESSENTIAL OILS' CHOLERA MIXTURE.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—With reference to the article on "Cholera at Goalundo Ghat Hospital" by Dr. W. J. Marshall in your issue for January 1926, p. 4 in which he states that the "essential oils' cholera mixture" is too pungent and irritating for general use, I desire to point out that although the mixture is undoubtedly pungent and may in some cases be somewhat irritating, such facts are too trifling for serious consideration where life and death are in the balance as is the case in cholera.

The characteristic pungency of the mixture may however in a considerable measure be obviated by administering half-drachm doses of the mixture every quarter of an hour in an ounce of water, instead of drachm doses, every half hour, in half an ounce of water as recommended in my original paper.

Sucking a small piece of ice after administration of the mixture also tends, where available, to minimise the tendency to vomiting which is a constant and inseparable feature of the disease.

The dose originally recommended by me was designed for field use where neither medical aid nor intelligent nursing was available, and where it was imperative if success was to be obtained in a majority of cases that the greatest possible quantity of the mixture should be administered in the shortest probable time, notwithstanding the increased risk of vomiting thereby incurred.

In making this recommendation I was influenced by the consideration that if half-drachm doses every quarter of an hour were advocated the patient would almost certainly in practice through want of proper nursing get half-drachm doses every half-hour instead of every quarter of an hour as intended, with the consequent increase in the risk of collapse from delay in administration of a sufficient quantity of the mixture to prevent it.

I also desire to take this opportunity to point out once more that the "essential oils' mixture" is in no way a rival of saline injections as a treatment for cholera, saline injections being a treatment for collapse and the "essential oils' mixture" a treatment to prevent it. Collapse having once set in, the time for administering the "essential oils' mixture" is in the great majority of cases over.—Yours, etc.,

J. W. TOMB, O.B.E., M.D., D.P.H.
MINES BOARD OF HEALTH,
ASANSOL,
15th January, 1926.

GYMNEMA SYLVESTRE IN THE TREATMENT OF DIABETES.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—There is a creeper plant named *Gymnema sylvestre*, natural order *Asclepiadaceæ*, whose leaves when chewed after a few minutes remove the sweet

taste of sugar. This quality has been noted by Halliburton in his *Handbook of Physiology* and also by Dymmock, Khory, Kirtikar and others in books on the indigenous drugs of India. Halliburton considers this action as due to a selective action on tongue papillæ.

As the taste of salt was not affected by the leaves it was thought that the action might be a chemical or a biochemical one. Rough experiments with a little of the powdered leaves mixed with diabetic urine reduced the percentage of sugar in the urine as tested by Benedict's solution. Certain laboratory experiments made by Professor Kolhatkar of the Ferguson College, Poona, showed that there was a chemical action. These tests were made with standardised glucose solution and Fehling's solution.

It was thought that if the action was a chemical one, the leaves might be useful in diabetes mellitus in reducing the amount of blood sugar and the urinary sugar. The leaves were given as a powder in half to one teaspoonful doses. It can also be given as a decoction (1 oz. powdered leaves are boiled with 10 ozs. of water till the quantity is reduced to 4 ozs.: 1 oz. for a dose, Khory). Some striking results were obtained in that the sugar in the urine was greatly reduced or totally disappeared.

Dr. Mhaskar at the Haffkine Institute, Bombay, is doing some experimental research work on it with encouraging results.

In one case the powder has been tried in a case of diabetic carbuncle as a dusting powder with apparently good results.

This note is written in order that medical officers may give the drug a wide-spread clinical trial in the treatment of diabetes, as the antidiabetic properties of this plant seem to have been overlooked hitherto.—Yours, etc.,

K. G. GHARPUREY,

Major, I.M.S.,

Civil Surgeon, Sholapur.

4th December, 1925.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel H. Hallilay, M.B., I.M.S., offg. Civil Surgeon, Simla, West, is appointed to hold charge of the duties of the Civil Surgeon, Simla, East, in addition to his own, during the absence on leave of Lieutenant-Colonel MacMillan.

Lieutenant-Colonel J. B. D. Hunter, O.B.E., I.M.S., an Agency Surgeon is posted as Residency Surgeon, Rajkot with effect from the 29th December 1925.

The services of Major F. A. Barker, C.B.E., I.M.S., have been placed temporarily at the disposal of the Government of the Central Provinces for employment as officiating Inspector-General of Prisons, Central Provinces with effect from the date on which he assumed charge of his duties.

Major S. S. Sokhey, I.M.S., is appointed temporarily to the Medical Research Department and posted as supernumerary officer at the Haffkine Institute, Bombay, with effect from the 18th August 1925. His services are placed at the disposal of the Government of Bombay, for employment as Officiating Assistant Director of the Institute with effect from the date on which he assumes charge of the duties of the appointment.

The services of Major C. McIver, I.M.S., are placed permanently at the disposal of the Government of Assam.

Major E. W. O'G. Kirwan, M.B., F.R.C.S.I., I.M.S., on being relieved of his duty as officiating Superintendent,

Campbell Medical School and Hospital, has been placed on general duty at the Medical College.

LEAVE.

Lieutenant-Colonel D. Heron, C.I.E., I.M.S., an Agency Surgeon, is granted leave on average pay for 8 months and on half average pay for 4 months, under Fundamental Rules, with effect from the 5th November 1925.

Captain S. N. Mukerji, I.M.S., officiating Civil Surgeon, Chittagong, is allowed leave on average pay for the period from the 18th December 1925 to the 2nd January 1926, both days inclusive.

PROMOTIONS.

Major to be Lieutenant-Colonel.

N. S. Sodhi, M.C. Dated 1st March 1925.

(Army Department Notification No. 1253, dated the 11th September 1925, in so far as it relates to this officer is cancelled).

Captain (now Major) H. M. Inman, I.M.S., is granted the acting rank of Lieutenant-Colonel from 1st October 1917 to 25th July 1918 whilst employed with the East African Force.

Lieutenants to be Captains.

Moore Taylor, M.B., I.M.S. Dated 18th October 1925.

C. V. Falvy. Dated 17th October 1925.

RETIREMENTS.

Lieutenant-Colonel J. H. Hugo, D.S.O., M.B., I.M.S., with effect from the 17th July 1925.

Captain J. F. Holmes, I.M.S. (since deceased), with effect from the 12th November 1924 on account of ill-health.

RELINQUISHMENT OF RANKS.

With reference to previous notifications, the under-mentioned officers of the Indian Medical Service relinquished their acting or temporary ranks, with effect from the dates specified:—

Major E. E. Doyle, D.S.O. Dated 2nd February 1921 (forenoon).

Major R. B. Nicholson, O.B.E., M.C. Dated 1st August 1918 (afternoon).

Major T. A. Hughes. Dated 13th July 1920 (forenoon).

Major J. A. Sinton, V.C., O.B.E. Dated 31st July 1920 (forenoon).

Major J. C. Bharucha. Dated 16th September 1919 (forenoon).

Major P. B. Bharucha, D.S.O., O.B.E. Dated 16th July 1920 (afternoon).

With reference to previous notification, Captain (now Major) T. D. Murison, I.M.S., relinquished the temporary rank of Major on ceasing to hold the appointment of Deputy Assistant Director of Medical Services (Sanitary) of the late Karachi Brigade, with effect from the 26th October 1920 (forenoon).

NOTES.

THE THIRTIETH CHEMISTS' EXHIBITION IN LONDON.

THE Thirtieth Chemists' Exhibition will take place on May 10th to 14th, 1926, at the Holland Park Hall, London, W. The exhibition was established in 1896, and has filled a very important need to the practising pharmacist in enabling him to see all the goods he sells and the apparatus, etc., which he uses in his profession under one roof. Last year's exhibition marked a record, and the much larger hall enabled the promoters to introduce a number of novel and interesting features. These will be continued and extended next May. The management is always delighted to welcome visitors connected with the drug trade from the Dominions and Colonies, and such gentlemen will be admitted on presentation of their professional card. The exhibition is organised by the *British and Colonial Pharmacist* and is strictly confined to the trade.

"PONNDORF" CUTI-VACCINATION.

WE have received from Messrs. H. R. Napp, Ltd., 3 and 4, Clements' Inn, Kingsway, London, W.C.2, a small brochure dealing with the "Ponndorf" method of cutaneous vaccination in prophylaxis against and in the treatment of tuberculosis of all types. This method is now in its second decade of trial, and many German reports speak of it very highly indeed. It has recently been shewn by the work of Besredka and others that we have neglected the skin too much as a system of the body capable of producing immune substances; in vaccination the principle has been made use of in universal vaccination since the days of Jenner; what is not realised however is that immunity to other infections may result from vaccination of the skin with other antigens. Further, in such vaccination the dosage can be very exactly controlled, the exact degree of reaction noted for future guidance, and the dose increased or decreased accordingly.

In the "Ponndorf" method the tubercular antigen is put up as "virus A" in sealed capillary tubes. The preliminary test, which is advisable in all cases, and absolutely essential when dealing with pulmonary tuberculosis, is to scarify the skin lightly—as in vaccination—and apply one drop of the virus over a scarified area about 1 cm. square. The degree of reaction is noted, and if not severe the preliminary vaccination may be followed by a course of vaccinations, not exceeding 18 or so within one year. In "virus B" a preparation is put up which—in addition to the tuberculin element—also contains antigens from the secondary micro-organisms associated with phthisis and chronic bronchitis.

In general the reports quoted in the brochure speak of the special value of the method in the sphere of early diagnosis and treatment of early cases of tuberculosis of all types. In cases of phthisis of the second stage very good results are reported; but cases of the third stage appear to be unsuitable, except where the infection is walled in by fibrosis. The two viruses are put up in sealed capillary tubes, and are stated to keep in any climate.

The same firm also issue "Xifal-milk," a sterile milk-protein combined with a vaccine of low virulence. In ampoules of 2 c.c. and 5 c.c. for hypodermic administration in cases of epilepsy, encephalitis lethargica, infantile paralysis, and gastric and duodenal ulcer. In these diseases it is stated that good results follow a course of such injections.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

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Original Articles.

THE PATHOGENIC EFFECTS OF HELMINTHIC INFECTIONS.

By ASA C. CHANDLER, M.S., Ph.D.,

*In Charge, Hookworm Research Laboratory,
Calcutta School of Tropical Medicine.*

THE question of the pathogenicity of various helminthic infections, and particularly of hookworm infections, has long been a matter of dispute. The general opinion is that hookworm infections are as a rule harmful, *Ascaris* infections much less so, and *Trichuris* infections practically innocuous. In support of this view, particularly with respect to hookworm infections, there is a great mass of evidence in the form of clinical observations and effects of treatment on individuals and collective groups in schools, estates, industrial institutions, etc. The majority of these observations have been made on people of the white race, and without reference to the intensity of the infections. The effect of light hookworm infections is a matter of considerable difference of opinion. Lane (1917) summarizes the situation as follows:—"Opinion regarding hookworm infection has constantly passed through three stages in the individual or the community. The first of these phases is an unreasoned conclusion that disease and death occurring in an infested subject are caused by that infestation. The second phase, based on the realization that in the tropics more persons than not are infested and that they appear to be in normal health, lays to the credit, or discredit, of the parasite no ill effects, unless the infestation be a massive one and makes the host obviously a sick man. The third stage consists of a realization, based on careful records of widespread improvement in health and energy following the freeing of infested persons of their infestation, that even mild infections have an influence for the bad on their victims." Lane quotes passages from reports of the Rockefeller Sanitary Commission which he says show quite clearly that the officials of the Commission started with their minds satisfied that mild infections were a matter of no moment to the host, and ended up thoroughly convinced that even very mild infections constitute a grave handicap to the unfortunate harbourers. Lane further quotes letters from managers of tea estates in the Darjeeling districts, where there is widespread but for the most part mild hookworm infection, which express satisfaction and in some cases enthusiasm over the effects on the health of the coolies of anti-hookworm treatment. Similar reports of improved health and augmented efficiency have been recorded from many different industries in many parts of the world.

It must be pointed out, however, that most of these mass observations add little to our knowledge of the effect of *light* hookworm infections, since all grades of infection are grouped together, and improved health and efficiency in a comparatively small number of heavily infected individuals or of a few especially susceptible individuals in the entire group might be sufficient to produce the observed improvement. Clinical observations on individuals have repeatedly shown that individual susceptibility is an important factor, and that the number of worms necessary to produce an evident effect on health may vary enormously. Ashford (1913) for instance, states that in Porto Rico many cases containing more than 1,500 worms showed little if any anæmia. Darling, Barber and Hacker, from their studies in Java, came to the conclusion that 250 worms on the average cause measurable loss of hæmoglobin, and think that it is reasonable to assume that 50 worms would cause 1/5th as much, whether or not their effect was counter-balanced by non-interference with reserve powers of the host by other causes. These authors concluded that a given number of worms would on the average cause more loss of hæmoglobin in women than in men, and more in children than in women, and that their effects are accentuated by weakening of reserve powers by malaria, malnutrition, overwork or other causes.

In my own study (1925) of 100 individuals in the Alipore Central Jail, 67 of whom were lightly infected with hookworm, but only six of whom had more than 1,000 eggs per gram of faeces, no difference in the hæmoglobin percentage between infected and non-infected individuals could be found. Mhaskar and Kendrick (1923) found a similar lack of correlation between hæmoglobin content and hookworm infection in light cases in Madras. Megaw (1920), on the other hand, in a study of over 4,500 jail inmates in various parts of the United Provinces (India) found a distinct correlation between the state of health, as shown by the prisoners' history sheets, and the degree of infection as determined by egg counts.

The most interesting recent contribution to this subject is a paper by Gordon (1925), on "The Effect of *Ancylostome*, *Ascaris* and *Trichuris* Infections on the Health of the West African Native," in which he reports some interesting and significant work based on a study of 137 African natives in Sierra Leone. The subjects included 49 youths averaging 18 years of age, attending school; 40 city police of all ages from 23 to 50; and 48 gaol prisoners of all ages from 17 to 49. Examination of these natives was carried out by the officers in charge of them with respect to the following characteristics:—(1) Physique and general fitness, as determined by a physical examination; (2) mentality, as determined by mental alertness and ability to learn; and (3) energy, as determined by the keenness with which an individual attempted any

mental or physical task allotted to him; the men were placed in order of merit in A, B or C class in each of these three categories. In addition two other tests were made in the laboratory; (1) hæmoglobin percentage, as determined by the Tallquist scale, and (2) presence of albumen or casts in the urine.

The degree of infection in these individuals was determined by the Stoll egg-counting method, without knowledge of the status of the individuals with respect to other tests. Careful analysis of the correlation between the degree of infection and the classification according to each of the above tests was made. In spite of the fact that many of the infections were very heavy (12 out of 114 having an average of more than 10,000 eggs per gram of fæces) no significant correlations were found in any case except the "energy" classification. There was no noticeable effect of *Ancylostome* (*Necator*), *Ascaris* or *Trichuris* infections on hæmoglobin percentage, physique and general fitness, mentality, or presence of albumen or casts in the urine. On the other hand the figures suggest the possibility of some association between hookworm infections of more than 15,000 eggs per gram of fæces, and the low standard of energy observed in such cases; the small number studied of such intense infections, however, makes it obvious that further work must be done to justify conclusions. Dr. Gordon is careful to state that his work deals solely with the West African male native and applies only to that race. It is certain that the white race is far more susceptible than the negro race; I have had occasion to observe this on numerous occasions in the Southern United States. Gordon points out that this tolerance may be shared by some at least of the Indian races, judging by hæmoglobin tests made by Mhaskar and Kendrick in Madras and Chandler in Bengal, but he overlooked Megaw's significant work in the United Provinces, referred to above.

It is unfortunate that Gordon did not include some tests of physical and mental endurance in his examinations since this would appear to be more important than short duration tests of mental and physical keenness and energy. There can be little question but that hookworm infection does cause severe anæmia in the white race and recent investigations by De Langen (1924), suggest that the effect is caused by a direct toxic effect on the blood-forming organs. The ability to make good an injury to the blood system, with the attendant results on other systems, may be sufficient so that no evident effect is present, yet a certain amount of energy and vitality must be used up to constantly repair the damage done, and as a result it is readily conceivable that resistance to fatigue, exhaustion and disease may be proportionately lowered. Up to a certain point the repair can keep pace with the damage, so that there is no hæmoglobin reduction; only when the infection is sufficiently heavy so that the repair cannot keep pace with the injury or when the reserve

power is weakened by other causes, is there any evident anæmia. It would appear from Dr. Gordon's work that this point is not reached nearly so quickly in the negro as in the white race. It seems to me not improbable that this may be associated with the development of a racial immunity—an ability to cope with the toxic effects of the parasite by some means not understood—resulting from age-long association of host and parasite, for it is a well-known fact that hosts and parasites do tend towards a mutual tolerance, where the injurious effects of one on the other are minimized. There seems to be good reason for believing that *Necator americanus* was brought to America by the African slaves, and it has always seemed to me significant that the adapted negroes showed much more marked tolerance than the unadapted whites.

If Dr. Gordon's observations on West African negroes do apply, even in a less degree, to Indian races, then hookworm infection in many parts of India may be considered practically harmless, for although a high percentage of people in India are infected, the infections are rarely heavy, as judged by egg counts, and of many hundreds of egg counts made in Bengal, not more than 10 per cent. exceed 1,000 eggs per gram of fæces. In one series of 127 cases in Eastern Bengal, 61 per cent. of whom were infected according to Lane's D.C.F. method, 46 per cent. of those infected had less than 100 eggs per gram, and not a single count exceeded 400 eggs per gram. It does not appear probable that if infections of 10,000 eggs per gram produce no noticeable symptoms in West African negroes, that infections of less than 1,000 eggs per gram would have an appreciable effect on Indians. However, until mental and physical endurance tests and accurate data on resistance to disease can be obtained, judgment on this point should be reserved.

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THE TREATMENT OF MYELOMATA BY CURETTAGE AND AUTOGENOUS CANCELLOUS GRAFTING.*

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THE treatment of myelomata by the method to be described was, as far as the writer can discover, first brought to the notice of the profession by Mr. A. H. Todd(1), who employed it with conspicuous success in the case of a myeloma of the outer condyle of the femur. Few who were privileged to hear Mr. Todd's description of his case, and to see his skiagrams can have failed to be impressed with the great possibilities of this form of treatment, in restoring both symmetry and function to the part affected, and for the writer's part, it formed the inspiration of the treatment employed on the case hereunder recorded.

M. A., male, aged 40, applied to hospital on 28th October, 1924, for treatment of a swelling on the ulnar side of the right forearm, in its lower third, extending to just above the wrist.

Of healthy cultivating stock, his history revealed nothing noteworthy except that his left leg had been amputated 8 years previously at the seat of election for gangrene following on injury.

Three years previous to admission, the patient had noticed a swelling in the lower third of the ulnar side of his forearm which had slowly but steadily increased in size until its interference with the power and movements of his hand caused him to apply for relief.

On examination there was a swelling of the general size and shape of a goose's egg involving the lower third of the ulna. The hand was held pronated, supination being impossible, and attempts to elicit it caused the patient a good deal of pain. Egg-shell crackling was elicited over the tumour in its posterior part, and the integrity of the middle of the inner aspect of the shell was doubtful. A radiogram (fig. 1) revealed the distension and thinning of the shaft of the bone with the bony septa typical of myeloma. A marked feature was the limiting reactionary compact bone at the upper pole, and the lower end of the ulna appeared also to be free.

Operation: 7th November, 1924.—An incision 5 inches in length extending from the left anterior superior iliac spine backwards, parallel to and immediately below the outer lip of the iliac crest was made, and carried immediately down to bone. The periosteum with the overlying muscles was stripped downwards with a rugine and strongly retracted, exposing an area of iliac bone some 4 in. by 2 in. With a broad gouge and hammer as much of the outer compact

layer and underlying cancellous bone as possible was removed from this area and transferred to a warm bath of autoclaved normal saline kept as near body heat as possible. The muscles and periosteum were then replaced, the cut edges of the former being united with three interrupted catgut retaining sutures, and the iliac wound was closed with Michel's clips.

Gloves, masks and gowns were now changed and during this interval the right upper limb was exsanguinated with an Esmarch's bandage and broad tourniquet.

An incision was made 5 inches in length along the inner border of the right forearm between the flexor and extensor and carpi ulnaris, extending from 1 inch below the styloid process of the ulna nearly to the middle of the ulnar margin of the limb. This was cautiously deepened till the ovoid swelling was defined and it was seen that its inner central part to the extent of a six-penny piece was softened. The periosteum was



Fig. 1.

next incised, in the line of the wound but "ringing" the softened area, and, with the overlying soft parts, stripped outwards and securely packed off with gauze to avoid future contamination with growth tissue. The inner side of the tumour was next incised at the softened area and the opening enlarged with scissors and nibbling forceps, till every bit of softened bony shell was removed. The tumour material was scraped out with a sharp spoon, and the whole of the inside of the ovoid cavity thoroughly and systematically curetted till every trace of tumour tissue had been removed. The opening into the tumour was then enlarged by removing the whole of the ulnar side of its shell, leaving an oval gap. The shell was found to be limited above by dense compact bone and below by a thin layer of similar bone overlying the articular cartilage. The interior of the cavity was next carefully

* Note.—We are much indebted to the Editor, *Guy's Hospital Reports* for his kind permission to re-publish this article, which appeared in that journal for January, 1926.—Editor, I. M. G.

swabbed out with pure carbolic acid. The excess of the latter having been thoroughly removed with absolute alcohol, the cavity was swabbed over with ether, dried with a stream of warm air, and the fragments of graft removed from saline and placed into the cavity, and the walls of the latter crushed down on to them. It was found that the graft was not sufficiently large entirely to fill the cavity, so further crushing was performed, the soft parts unpacked and allowed to fall over the gap in the bone, and the wound closed by Michel's clips. Dressings having been applied, the hand was fully supinated and firmly bandaged upon a zinc "cock-up" splint, the tourniquet removed, and the patient returned to bed.

During the whole operation, Lane's technique for bone operations was rigidly adhered to, and the gloved hand never touched the wound. Instruments which had touched myelomatous tissue were discarded after use, and fresh instruments used after the sterilization of the tumour cavity. The tumour material was despatched to the Central Research Institute at Kasauli, where, by kind permission of the Director, it was examined by Major L. A. P. Anderson, I.M.S., whose report is as follows:—

"The sections of the material show the typical structure of a myeloma." Fig. 2 is a microphotograph showing the appearance of this tissue

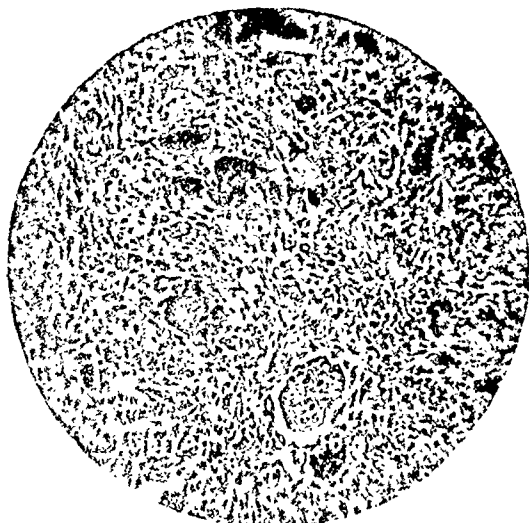


Fig. 2.

on section. To enter into any discussion of the histology after the work of Burlend and Harries would be invidious, more especially as the method of removal of the myelomatous material precluded any serial sectioning. Suffice it to remark that study of these sections offers striking confirmation of the observations of these authors as to the appearance and staining reaction of the giant-cells and the genesis of the spindle cells.

Hæmorrhage was controlled by firm bandaging which was cautiously loosened after 24 hours, and movements of the fingers were encouraged from the start. The clips were removed in two stages on the eighth and tenth days. On the latter

occasion, a little serous discharge from the centre of the wound occurred. Forty-eight hours later when next dressed, there was none, and the wound healed by primary union. Gentle massage was then instituted and finger movements increased with daily active and passive movements of the wrist. After a month the splint was removed for an hour daily and active movements progressively increased, with special attention to pronation and supination. After two months the "cock-up" splint was replaced by a straight splint to the wrist, and continuous active movements and performance of light tasks encouraged; and the patient left hospital with free wrist movement and wearing a wrist splint on 24th January, 1925.

After four months all splinting was dispensed with, and the patient advised to use the hand for light tasks. Radiograms taken 1, 2, 3, 5, and 7 months after operation respectively, show the progress of the graft. Figs. 3 and 4 show the conditions present 7 months after operation.



Fig. 3.

Especially noteworthy in the radiograms taken is the tendency shown by the new bone progressively to revert to the normal outline, thereby bearing out the graphic phrase of Sir Arbuthnot Lane that "the skeleton is the crystallization of lines of force." At seven months after operation the patient reports that the right hand and arm is but little weaker than the left, and, as shown in Figs. 5 and 6, he has full pronation and supination, while an idea of power may be gained from the fact of the ease with which he is holding up a large earthenware pot full of water.

Remarks.—It would appear that this form of treatment of myeloma has not yet received the attention which it deserves. Diagnosis of the

condition having been established and the disease being confined to bone, conservative treatment is the obvious indication. Rowlands and Turner(2) quote V. Moseitig and others as having



Fig. 4.

Semi-pronation showing tendency of new bone to assume normal outline.

extensively used various fillings such as iodoform wax for the filling of bone cavities, but only in cases of caries, and their criticism of these methods is that "most of them have proved



Fig. 5.

failures." These authors make no reference to this treatment being applicable in myeloma. Burlend and Harries(3) in a most instructive article describe the treatment of a white myeloma

by a boiled heterogenous graft. Such, however, according to Trethowan(4) neither live nor proliferate, acting merely as a scaffolding—a contention substantiated by the radiographs published by the two former authors. Carson(5) refers pessimistically to the treatment of myelomata by homologous grafts from a "recent amputation or from a corpse." The pessimism prevailing as to the success of wax fillings, heterogenous, and homologous grafts is scarcely surprising in view of the facts that they are inert substances, which if inserted with due regard to asepsis can at best but act as scaffoldings. Trethowan(6) in laying down the principle governing the grafting of bone lays stress on the advisability of an autogenous graft, but the same author states that the breaking up of the graft has no advantage. Todd's case, cited above, and the one here recorded, on the other hand, would seem to suggest that this method, which is the essential of cancellous grafting, has the very definite advantages of (1) providing the maximum number of osteophytes possible, and (2) providing a malleable



Fig. 6.

medium for the "lines of force" generated by carefully graduated active movements of the part when protected by accurate splinting. The results of these advantages are seen in the earlier return of function and the greater degree of symmetry obtained by this method than by the grafting of compact bone. Todd has shewn that no evil effects attend the removal of even large quantities of the iliac bone. In the case here recorded this question in view of the previous amputation hardly arose.

SUMMARY.

The suggestions put forward are:—

- (1) That the treatment of myelomata by curettage and autogenous bone grafting is worthy of a more extended trial, and, provided rigid

asepsis is observed, holds out the promise of good results.

(2) That cancellous grafts, as malleable bone forming media tend, in association with graduated movements and accurate splinting, to an earlier restoration of function and symmetry than do grafts of compact bone.

I am indebted to Lieutenant-Colonel S. R. Christophers, C.I.E., I.M.S., Director, and the Officers of the Central Research Institute, Kasauli, for the pathological examination and the microphotograph of the tumour material, and to the Editor, *Guy's Hospital Reports*, for permission to republish.

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A PRELIMINARY NOTE ON THE PHARMACOLOGICAL ACTION OF SOME ORGANIC-ANTIMONY DERIVATIVES.*

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DURING the last decade a number of organic-antimony derivatives (aromatic) have been introduced for the treatment of certain tropical diseases of protozoal nature. The origin of these aromatic antimonials was due to the work of Michaelis and Reese whose investigations led to the preparation of triaryl-stibines. Later, Grignard's reaction gave rise to the preparation of triphenyl-stibamines. Most of the present development of the organic-antimony derivatives, however, is due to the work done by Chemische Fabrik Von Heyden who discovered the process of introducing into the aromatic nucleus the antimonial group through the agency of the diazo-

reaction. Great impetus was thus given to the synthesis of aromatic antimonial drugs and most of the antimony analogues of the aromatic arsenical drugs such as atoxyl, salvarsan, etc., were prepared. From aniline by diazo-synthesis it was quite easy to prepare phenylstibinic acid and then para-amino phenylstibinic acid (p-stibanilic acid) which is the antimony analogue of p-arsanilic acid. Its sodium salt, sodium-para-amino-phenylstibinate (or sodium p-stibanilate), is the antimony analogue of the arsenical compound known as atoxyl or arsamin (sodium p-arsanilate). This compound was later given the name of *stibamin* by Dr Brahmachari from its analogy to the corresponding salt of arsenic which is called *arsamin*. A derivative of this sodium acetyl-p-amino-phenyl stibinate was called *Stibacatin* which was one of the earlier members of the aromatic series to be used in therapeutics against leishmaniasis. This was put on the market by Messrs. Allen and Hanbury under the trade name of *Stibenyl*. This compound is soluble in water, is stable and does not irritate the tissues to the same extent as do some of the organic-antimony compounds. Unfortunately, however, it did not prove of any great therapeutic value in kala-azar in this country. The sodium salt of p-amino-phenyl stibinic acid, or sodium p-amino-phenyl stibinate (*Stibamin of Brahmachari*) is also a soluble compound which, though therapeutically active, is unfortunately not very stable. Its therapeutic application was, therefore, limited. The carbamide derivative of p-amino-phenyl stibinic acid was then prepared by Brahmachari by warming p-amino-phenyl stibinic acid suspension in water and urea, until the whole of the acid is almost dissolved; this is concentrated on a water-bath and the salt is precipitated by the addition of alcohol. The resultant substance was called *urea-stibamine* and is a pentavalent compound of antimony. Brahmachari believes this substance to be not a urea salt of stibanilic acid but a substituted urea. Henry has, however, criticised and doubted the constitutional formula given by Brahmachari.

The combination of urea with p-amino-phenyl stibinic acid renders this compound more stable and soluble (p-amino-phenyl stibinic acid is not soluble) and at the same time more efficacious therapeutically. It is a well-known fact that when quinine is combined with urea, its solubility and diffusibility is considerably increased and the resultant compound is able to penetrate better into the tissues; its local anaesthetic action is also much enhanced. The same probably happens in the case of *urea-stibamine*. Better penetrability of the compound probably accounts for the superior therapeutic results obtained by this drug as compared with the previous compounds. There are two brands of *urea-stibamine* on the market. Our chemist, Mr. N. R. Chatterjee analysed these samples of *urea-stibamine* and found them for all practical purposes to be the same. Dr. Napier has used both these brands

* Whilst this issue was in the press an announcement has been made that Dr. Brahmachari has obtained an injunction to restrain the Union Drug Company from using the name urea stibamine as a designation of the carbamide salt of p-amino-phenyl-stibinic acid.

The effect of this judgment is to give to Dr. U. N. Brahmachari the sole right to the use of the name urea-stibamine for the purposes of manufacture and sale of the drug.

We had hitherto been under the impression that the name urea-stibamine was a scientific description of a valuable drug which had been prepared by a medical scientist for the use of the whole world. According to the recent judgment it is only the process of manufacture which is common property, the name urea-stibamine is held to be a fancy trade designation, which Dr. Brahmachari alone is entitled to use.—EDITOR, I.M.G.

in the Carmichael Hospital for Tropical Diseases and the clinical results were equally good; I will show later in this paper that their pharmacological reactions in animals are almost identical.

Von Heyden a few years ago, introduced a compound, metachloro-para-acetyl-amino-phenyl-stibinate (Von Heyden 471) to which they gave the trade name of *Stibosan*, and later they introduced another compound, an amino salt of para-amino-phenyl-stibinic acid. Both these compounds have given very good results in kala-azar in Dr. Napier's hands. They are more efficacious than some of the earlier organic-antimony aromatic compounds such as *Stibenyl*, and are as good as *urea-stibamine*. A number of other organic-antimony compounds (aromatic) have been put on the market lately and some of them have been tried in the treatment of kala-azar with success. One of these compounds is p-amino-phenyl-stibinic acid urea-glucose, which has been prepared by the Union Drug Company, Limited, and they have given the compound the following formula $C_6H_4NH_2 \cdot CO \cdot NH \cdot C_6H_4 \cdot SbO(OH)(ONH_2)$. This compound has been given the trade name of '*Amino-stiburea*' and Napier has obtained good results with it in kala-azar. Yet another compound has been prepared to which the name of '*Novo-stiburea*' has been given, but its composition has not yet been disclosed. This compound is claimed by the makers to be quite stable; it can be dissolved in tap-water, its solution can be sterilized by boiling and it is said to have good keeping properties. If the compound is really stable and as effective therapeutically as *urea-stibamine* or *Stibosan* it will make a distinct

advance in the treatment of kala-azar. Most of the antimony compounds in use at present are unstable in the air even in a solid condition and in solution they change very rapidly.

These compounds are of great importance in the treatment of kala-azar and are being injected intravenously. No attempt has been made, so far as I am aware, to work out their pharmacological action. As these compounds are being used extensively in this country, I have undertaken to work out their pharmacological reactions in animals. In this paper the results of my observations have been summarised; but the detailed work with the graphs will be published later, in a more technical journal.

The Pharmacological Action of Antimony Compounds.—The pharmacological action of these compounds was investigated on cats. The animals weighed 1,800 to 2,500 grammes and were anaesthetized with urethane, a small amount of ether being given when necessary. The blood pressure was recorded by putting a cannula into the carotid artery and the volumes of the intestines, the spleen the kidney and the limb were recorded in the manner usual in pharmacological tests. The pulmonary pressure was recorded by the delicate method described by Jackson and Rapp. The drugs were injected into the femoral vein in doses ranging from 10 mgm. to 100 mgm. The 10 mgm. dose was, however, found to be too small to produce any effects, while with 100 mgm.s. the reaction was severe and often the animal succumbed. Doses of 50 mgm. gave good reactions and we used this quantity in most of our experiments. The results obtained are shewn in the following table:—

Table summarising the pharmacological action of Antimony Compounds.

	Sodium antimonyl tartrate.	"Urea-stibamine" Both brands.	"Stibosan" Von Heyden's 471.	"Amino-stiburea" Union Drug Co.	"Novo-stiburea" Union Drug Co.
1. Blood Pressure, Systemic.	Slight fall	Marked and lasting fall. Heart slow and irregular. Pressure regains its normal level.	Great fall, may go down to zero. Heart very irregular. Pressure slowly regains its normal level.	Slight fall of B. P.	Slight fall.
2. Blood Pressure, Pulmonary.	Fall followed by slight rise.	Marked and sustained rise.	Marked and persistent rise.	Marked rise.	Rise.
3. Cardiometer and Myoca-diograph results.	Marked momentary depression.	Slight but lasting depression.	Slight and persistent depression.	Slight and persistent depression.	Slight depression.
4. Isolated Heart (Mammalian).	Marked depression.	Momentary depression. Relaxation of ventricles.	Depression. Heart irregular.	Depression. Relaxation of ventricles.	Slight depression.
5. Respiration ..	No effect, sometimes slight stimulation.	Stops momentarily, then depressed. Amplitude decreased.	Stops longer, then restarts.	No effect.	Slight quickening.
6. Spleen volume	Increase.	Marked increase. Rhythmic movements.	Marked increase. Rhythmic movements.	Marked increase. Rhythmic movement.	Increase.
7. Intestinal volume.	Decrease	Decrease.	Decrease	Decrease	Decrease
8. Kidney volume	Decrease	Decrease	Decrease	Decrease	Decrease.
9. Limb volume ..	No effect	Slight decrease	Slight decrease	Slight decrease	Decrease.

Discussion of the Table.—A perusal of the table will show how the blood pressure, respiration, and different organs react to intravenous injections of antimony compounds. All the compounds with the exception of *Novo-stiburea* produced a fall in blood pressure immediately after injection, as will be seen from a glance at the horizontal column No. 1. The two brands of *urea-stibamine* we tested gave a marked depression amounting in some cases to 20 to 25 mm. of mercury. With *Stibosan* the fall of blood pressure was even more marked being as much as 50 mm. of mercury; in some cases the pressure went down to zero, the animal at the same time showed marked symptoms of collapse. The heart became slow and irregular but gradually recovered and the blood pressure came to the normal level. Dr. Napier informs me that occasionally he gets a case in which sensitisation develops, and suddenly after 5 or 6 injections, injection of the usual quantity of any of the pentavalent antimony compounds, produces marked collapse. I had a patient who had an injection of a small therapeutic dose of *Stibosan* for the first time and who showed all the signs of severe collapse.

All these substances have a depressant action on the heart and they relax the ventricles in the same way as do the cinchona alkaloids; this will be seen by a perusal of the horizontal columns Nos. 3 and 4. With regard to the effect on the pulmonary blood pressure recorded in horizontal column No. 2, there is a marked rise in pulmonary pressure with all the organic-antimony compounds which we have tested. It is worthy of note that arsenical compounds such as salvarsan also cause a marked rise of pulmonary pressure, and this is of interest in connection with the "nitritoid crises" which are produced by administration of this drug. It is quite likely that the symptoms which occur in patients after injections of antimonial compounds may be due to changes occurring in the pulmonary circulation. This point is under investigation. In horizontal column No. 5 will be seen the effect of intravenous injections of antimony compounds on the respiration. *Urea-stibamine* and *Stibosan* produce a more marked effect on the respiration than sodium antimony tartrate, *Amino-stiburea* and *Novo-stiburea*. With the two former drugs the respiration may cease for 10 to 30 seconds, but it is not permanently paralysed and quickly regains its normal amplitude.

The effect of antimony salts on the spleen is recorded in horizontal column No. 6. There is a well marked increase in size in all cases; with *urea-stibamine* and *Stibosan* this action is more marked than with tartar emetic. Is it possible that this increase in spleen volume has something to do with the therapeutic effect produced by these compounds in curing leishmaniasis? The spleen is a reservoir of parasites and the influx of blood charged with antimony into this organ might contribute towards the destruction of the parasites and cure of the disease. Horizontal

columns Nos. 7, 8 and 9 show the action on the intestine, kidney and limb volume.

I have much pleasure in acknowledging the help that I have received from Captain Premankur De and Mr. Nihar Ranjan Chatterjee in the course of this research.

SUMMARY AND CONCLUSION.

The action of a number of organic-antimony derivatives has been tested on cats. All these substances have a more or less depressing effect on the heart, circulation and respiration. The systemic blood pressure falls, whilst the pulmonary blood pressure rises. The volume of the spleen is markedly increased, while the volume of the intestine, kidney and limbs decreases.

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AN ENTOMOLOGICAL EPISODE OF THE EAST AFRICAN CAMPAIGN.

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DURING the year 1915, I was stationed at a large post in East Africa in the crater-like depression of an isolated volcanic mountain. This mountain had been held for some months by the Germans, and when we occupied it, we found ourselves obliged for reasons of defence to place part of our troops upon the site of the old German camp. We had not been there for many days before we found that the site was heavily infected with jigger fleas, left doubtless by the African troops and porters of the German force.

Our men, mainly European and Indian troops who had little or no previous experience of the jigger, rapidly became infected to an alarming extent, and in a few weeks' time nearly half our garrison was unfit to march. Everything that could be thought of was done. All troops wore boots and socks and were warned not to put their naked feet to the ground. Tent flaps were raised during the day to allow sunlight to beat upon the floor. Tent sites were frequently changed, and a weekly inspection of the men's feet was instituted and all jiggers removed and killed. Still the disease continued. Raised beds constructed from brushwood were built inside the tents and the floors leaped to reduce dust. Kerosine oil emulsion was sprayed on the floors of tents and huts, and the men's socks were treated with the same solution. Facilities were

provided for the men to have daily baths. Inspection of feet was increased to twice a week; still there was little appreciable reduction, and the number of men attending hospital for dressing of septic jigger sores severely taxed our medical resources. Matters became so serious that it was feared that evacuation of the camp would have to be urged on medical grounds.

At this juncture I made the somewhat novel proposal that we should completely reverse our policy, stop all our kerosine oiling, etc., and either order or at least encourage all men when in camp to go about barefoot. I further proposed to inspect the feet of each man in the camp every day.

As can readily be imagined, the proposal met with a good deal of opposition, but with the moral support of an I. M. S. colleague and having regard to the failure of our previous methods, I succeeded in obtaining permission to give my proposal a trial. All officers were asked to advise their men to go barefoot in camp as far as possible, and I made arrangements in my ambulance for daily foot inspection and jigger removal. About sixty African stretcher bearers, experts in the detection and removal of jiggers, were utilised for this purpose, and each was provided with a small tin for removed jiggers, which were collected in bottles containing perchloride of mercury and counted. Medical orderlies armed with bottles of tincture of iodine painted the small wounds caused by removal of the jiggers, and applied dressings to the more serious cases.

The number of jiggers caught and destroyed in the first few days was rather alarming to their human hosts. In spite of all precautions I myself had eleven jiggers in my foot, and removed at one time as many as sixty from the feet of an Indian sepoy.

By the end of a week, however, there was a noticeable reduction in jigger infection, which was much more marked by the end of a fortnight; and in a month's time from the institution of the system the jigger scourge had practically ceased to trouble us, and the number of jiggers removed daily per 100 men had dwindled from 315 to 5.

The result in spite of the dislocation of duties caused by the daily inspection wholly justified the measures adopted.

At the end of a month I was obliged, for reasons beyond my control, to reduce the inspection of feet from daily to twice weekly, but in spite of this the number of jiggers was kept down to such an extent that they ceased to be a further source of danger.

It seems probable that had I been able to keep up the daily inspection of feet and removal of jiggers for another month, I would have trapped and destroyed all the jiggers in the camp.

The success of this experiment depended of course upon the fact that the jigger flea can only breed in the body of its host, and that our daily inspection prevented this by detection and

removal of the female jigger before it had time to develop its eggs. The victims of the parasites themselves became the trap which lured the jigger to its destruction. In this case we are assisted by the comparative absence of suitable hosts other than man, and by the isolated position of the post, which prevented repeated reinfection.

A NOTE ON THE USE OF EMETINE INTRAVENOUSLY.

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WITH much interest I have read Dr. Vasavada's letter published on page 478 of the *Indian Medical Gazette* for September 1924, and another one by Major Porter, D.S.O., R.A.M.C. (retd.), on page 589 of the November number of the same year; and I do not think it is too late to support their views on the use of intravenous administration of emetine on the strength of the following experience.

From June to December, 1925, I was lucky enough to have an opportunity of treating as many as 70 cases of amoebiasis in the dysentery ward of the Haddo Hospital, including 6 relapses, with a case mortality of roughly 12½ per cent.

The routine method adopted for the treatment of these cases was to give them a one-grain dose of emetine intravenously for nine consecutive days, followed by an interval usually of six days during which time only a morning saline aperient was given; after this they were again given intravenously another course of six injections similar to the above on six consecutive days. Deek's intensive bismuth medication was combined with emetine as a rule and consisted in the administration orally, of two drachms three times a day of either the carbonate or the subnitrate. Later, however, when the stock of bismuth ran short in the hospital, it was either replaced by sodium bicarbonate given in 30-grain doses, three times a day, or the treatment carried on with emetine alone.

Thus it will be seen that each patient at the end of the treatment had received a total of 15 grains of emetine and altogether well over 1,000 injections were required for the treatment of the whole series.

During the course of the treatment, the patients were carefully observed and after completion of the course, they were usually kept in the hospital for several days before being finally discharged. On being discharged from the hospital, they usually joined what is called the "post-dysenteric gang," when they did light labour, stayed within the hospital premises and attended the hospital once daily. As a rule no patient is sent back to full labour unless he has been in the post-dysenteric gang for a period of at least one month; and during this time of their stay a weekly examination of the stools is carried out.

It may not be out of place to mention here that in each case the diagnosis was accurately established by the microscope and nothing short of the presence of actively motile *Entamœba histolytica* was accepted as proof positive of the condition before the treatment was commenced.

On the strength of the experience gained, it can safely be said that the method of treatment, besides being altogether painless, is simple and safe and is devoid of the dangers it is commonly supposed to involve. No reaction of any sort either immediate or remote was noticed; and in not a single case was there any reactionary pyrexia noted. On one occasion, however, three patients injected at the same time, developed a rigor soon after the injection; but this I am inclined to attribute to some fault in the rain water used to dissolve the emetine rather than to anything else, for the reason that these patients had received their previous injections all right and showed no such symptoms on receiving their subsequent injections. On the whole the results obtained were fairly uniform. Only two of the patients complained of any giddiness or lethargy and none of them had anything like emetine diarrhœa or what is called post-emetine debility. The two cases referred to, complained of weakness and giddiness and developed tachycardia soon after 3 grains of emetine was given to them, but this could be easily accounted for by the fact that they had undergone full courses of emetine only about a fortnight prior to their admission to this hospital.

With reference to the nature of cases treated, it is important to note that some of the cases who received the above treatment were in an advanced state of debility and anæmia consequent upon the co-existence of various other infections. Some cases of the series had as low a weight as 83 lbs., and as low a hæmoglobin value as 40 per cent. Amongst the lot, 12 patients had associated malaria and 6 had a co-existing infection with ankylostomiasis. There were two who had malarial cachexia with their spleens reaching to below the umbilicus and across the median line; and one of these had a febrile attack from 27th August, 1925, to 11th September, 1925, and showed malignant tertian rings in the blood as late as the 10th September, 1925, with a hæmic murmur and a hæmoglobin value of 45 per cent. There were again two others who had ankylostomiasis, bronchitis and at the same time a mixed infection of benign and malignant tertian malaria besides having amœbiasis; and there was one case where sprue co-existed with the attendant emaciation, debility and hæmic murmur.

In spite of the nature of cases being such as has been described, tolerance to the form of treatment prescribed was fairly satisfactory and it may be justly concluded that there is no reason why such a method of treatment should not be extended to patients in private practice, if rest in bed whilst under treatment can be rigidly enforced.

In private practice, however, a close watch of the patient is often not possible and at the same time a maximum of benefit is desired with a minimum of risk; and it is here only that the need for adopting the safest course possible cannot be too strongly emphasised. Under such circumstances the ideal treatment to be recommended would be the one advocated by Majors Acton and Knowles in the July 1924 number of the *Indian Medical Gazette*, where the total emetine received by the patient does not exceed a maximum of 12 grains. With this dosage, emetine administered intravenously would be as safe a procedure as when given by any other method.

Whether the therapeutic efficiency of emetine is increased by its administration intravenously is a question that cannot be answered at present as it does not lie within the scope of the present paper. Before answering this it will have to be ascertained (1) whether with this treatment negative results of the stool examinations are more quickly obtained than otherwise; (2) whether the subsequent effect of emetine is of a more lasting nature; and should the answer to this be in the affirmative then, (3) to what extent is the tendency to relapses cut short? All these questions, it is hoped, will be dealt with at a later date on obtaining a second microscope exclusively for the use of the dysentery ward.

With regard to the treatment of chronic cases it is feared that the value of emetine is not improved by this method and one should not be surprised if the results prove as disappointing as with other methods of administration as will be seen from the tabulated details of the six relapses. Considering again the massive thickening and fibrosis of the gut found at post-mortem examinations conducted on such cases one can only feel pessimistic as regards the prospects of cure of such pathological conditions under any drug treatment.

Details of Relapses.

No.	Date of discharge after 15 grains of emetine intravenously.	Date of readmission with relapse when motile <i>E. histolytica</i> was again recovered.	No. of days after which relapse occurred.
1	19-6-1925	3-11-1925	136
2	20-7-1925	5-9-1925	46
3	9-8-1925	3-12-1925	115
4	8-9-1925	28-12-1925	110
5	19-9-1925	8-12-1925	79
6	12-12-1925	6-2-1926	55

Lastly, I am much indebted to Dr. A. Bayley-de Castro, Junior Medical Officer, Haddo, not only for letting me have free scope for work but also for the personal interest he took in the dysentery patients.

SUMMARY.

(1) From June to December, 1925, 70 cases of amœbiasis, including six relapses, were treated

in the dysentery ward of the Haddo Hospital with a case mortality of about $12\frac{1}{2}$ per cent.

(2) Emetine intravenously was made use of combined as far as possible with Deek's intensive bismuth treatment; altogether over 1,000 injections were given.

(3) Nine injections, each of one grain, on 9 consecutive days were given, followed by an interval usually of 6 days; after which another 6 injections were similarly given, so that each patient at the end of the course received a total of 15 grains of emetine.

(4) The series included cases with as low a weight as 83 lbs., and as low a hæmoglobin value as 40 per cent. It also included cases of advanced debility and anæmia consequent upon the co-existence of various infections such as acute malaria, malarial cachexia, bronchitis, ankylostomiasis and sprue.

(5) The tolerance to the form of treatment prescribed, however, was fairly satisfactory and no toxic symptoms due to emetine were recorded.

(6) The use of emetine intravenously, besides being painless, was found safe and simple and appears to be practically free from the dangers it is commonly supposed to involve.

(7) If rest in bed could be rigidly enforced during treatment (which is equally necessary when emetine is given by any other method) it would be quite safe to extend this method of treatment to patients in private practice, provided that the total emetine so given does not exceed a maximum of 12 grains.

(8) The question whether emetine on intravenous administration gives better therapeutic results remains undetermined, as no such attempts could be made for want of proper means and facilities.

(9) From the extensive thickening and the massive fibrosis of the gut seen at post-mortem examination on the fatal cases and in view of the fact that relapses occurred within a period varying from 46 to 136 days, it appears that so far as the treatment of chronic cases is concerned the results under this treatment are as disappointing as with any other method of administering emetine.

CHOLERA AND RIVER WATERS.

AN EPIDEMIOLOGICAL SUGGESTION.

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Two extremely interesting and important papers have appeared in the *Indian Journal of Medical Research*, by Ross and Bagchi, on "The seasonal variation in the reaction and hardness of river water in India." The authors have demonstrated the occurrence of a change in the reaction of Ganges river water from alkaline to acid beginning about April, before the onset of the rains, and a swing back from acid to alkaline

in October or later. They have shown that the acidity is due to the presence of free CO_2 , liberated from the calcium bicarbonate present in the water, which is replaced by calcium nitrate. These observations have an important bearing on the question of turbidity of rivers and the natural and artificial purification of these waters.

The basin of the lower Ganges is generally recognised as the endemic home of cholera, and it is well known that cholera has a tendency to become endemic in the basins of great rivers. Cholera in India is a definitely seasonal disease. On this point Sir Leonard Rogers remarks: "In Lower Bengal and Calcutta the disease is present throughout the year, but has a very definite maximum season in the dry months of March to June when the ground water level is at its lowest point, and the water-supply most deficient and foul, and an equally marked minimum in the rainy season with a high water level and very thorough flushing out of all water-supplies." Referring to cholera in the basin of the Brahmaputra in Eastern Bengal and Assam, the Sanitary Commissioner with the Government of India states in his Annual Report for the year 1909: "The curve of monthly deaths showed a double rise, the first during March, April and May, the second during October to December. These epidemic rises indicate for this province the usual seasonal incidence of the disease, which is thought to depend upon the rise and fall of the great rivers." In the same report for the year 1918, referring to India in general, the statement appears: "Cholera is markedly seasonal and there are generally two waves each year. The major wave is between April and July and the second or minor wave is in the autumn, in October."

It will be noted that these waves of cholera incidence coincide more or less closely with the change-over in the reaction of Ganges water discovered by Ross and Bagchi, the neutral points occurring simultaneously with the two cholera waves.

These facts suggest the possibility that there may be some connection between the two phenomena. We know that pure water is not a good culture medium for cholera vibrios; we also know that the organism is sensitive to acid, but can grow readily in a medium which is so alkaline as to inhibit the growth of other organisms. Stitt puts the pH limits for growth of *Vibrio cholerae* as 6.4 to 7.9 and the optimum limits as 7.0 to 7.4, and it appears reasonable to assume that the organism will stand a better chance of surviving and multiplying in Ganges water when the pH is between these limits. Writing on "The influence of pH upon bacterial metabolism," Mansfield Clark states: "The reaction of the medium even within the zone of optimal bacterial growth is found to influence either the rate, or the relative rate of specific types of metabolism." In Ross and Bagchi's observations the neutrality points were estimated by means of neutral re-

and the useful range for that indicator is a pH of 6.8 to 8. It is evident, therefore, that Ganges water will have a pH favourable to the growth of cholera vibrios at or about Ross and Bagchi's neutral points, which as already mentioned, coincide more or less closely with the two cholera waves. Ganges water must be subject to repeated infections throughout the year, but it is possible that the infection dies out rapidly at times when the reaction of the water is either too acid or too alkaline for the organism to multiply rapidly, and when the temperature also is unfavourable.

I suggest that this interesting relationship between the reaction of Ganges river water and the two rises in cholera in each year may be more than a coincidence, and that the change which takes place in the reaction may prove to be a factor of importance in the epidemiology of cholera.

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EAR, NOSE AND THROAT DISEASES AMONG CALCUTTA UNIVERSITY STUDENTS.

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THE Calcutta University Student Welfare Committee have very kindly asked for my views in the matter of medical examination of college students with reference to ear, nose and throat diseases. As I consider the subject to be of great importance not only from the point of view of the college students but also from that of the community in general, and hence deserving of much more attention than it generally gets, I thought I might write something about the significance of these diseases in the *Indian Medical Gazette*.

The committee have been conducting the medical examination of the Calcutta college students since March 1920, with a view to ascertaining the general condition of their health. These examinations have revealed a most appalling state of affairs, which demands most urgent and immediate attention. It has been found out that 71 per cent. of the students suffer from some sort of physical defect or other. Most of these are preventable, if attended to at a sufficiently early stage.

The importance of these health examinations cannot be over-estimated and this effort is certainly a move in the right direction. But the usefulness of these examinations would have been greatly enhanced if instituted at a much earlier state. What I mean is that a comprehensive system of *school* medical examination should be adopted in addition to these college examinations, as is done in England and other European countries. The reason for this is obvious. Many of the ailments from which our college students are suffering date back to their childhood or school days, and it is then that the disability, if detected, being at its very onset, would have the best chance of being easily corrected. This is applicable very particularly to ear, nose and throat diseases.

Unfortunately there is no branch of surgery which is so much neglected in this country as that of ear, nose and throat diseases. Every day in the hospital clinics are seen numerous cases where an acute inflammatory condition of the middle ear has been allowed to progress until a state of chronic suppuration, with all its attendant sequelæ, has resulted. What an enormous number of students—both in the schools and in the colleges—there are who have got diseased tonsils, adenoids and enlarged glands in the neck, with broken-down constitutions and flat, deformed chests. The pity of it is that the patients do not seem to realise the seriousness of these diseases at their early stage and even when they are fairly advanced they do not generally undergo proper treatment. This deplorable state of affairs is due mainly to ignorance and apathy of the general public and to some extent, if I may be allowed to say so to indifference on the part of the attending physicians.

Over 70 per cent. of all ear diseases are middle ear diseases and these may be catarrhal or suppurative in nature. These, if long-continued and not properly treated, will end in deafness. Infectious diseases, e.g., measles, influenza, whooping-cough, small-pox, typhoid fever, scarlet fever, etc., are responsible for the majority of the worst types of suppurative middle ear disease and it is at their beginning that so much can be done to prevent a progressive and chronic disease with consequent deafness. It goes without saying that once deafness has set in and has been moderately severe, it renders a man incapable of being useful in any sphere of life. There is the further handicap that none of the prominent life insurance companies will accept an applicant with chronic or intermittent otorrhœa and here we are brought face to face with the business man's view of the disease. Hence it is very important not to neglect these ear diseases at their early stage.

What then are the early symptoms of these troubles? I will give here, in the briefest possible manner, a few typical symptoms in illustration. The patient will say that all on a sudden

one night he felt a severe pain in his ear and since then it has been "stopped" and he cannot hear distinctly with that ear. Along with this there may be a slight rise of temperature and a general feeling of illness. From this short history we can guess that the patient is suffering from acute otitis media. Again a father will come with his child, with the story that the boy has of late been listless and does not respond to questions unless these are repeated twice or thrice. Another patient will complain that he feels "very heavy" in his ears and is being disturbed with all sorts of buzzing noises in them. Here we have before us cases of catarrhal otitis media with the beginning of deafness. Naturally we are asked if there is anything wrong in their ears. We examine the ears but our examination must not stop there. The ear is never thoroughly examined until we have examined the nose and throat. It is not recognised by the public, and not much importance is placed by the general practitioner and those not practising the speciality, on the fact that an aural condition may have been—has been, indeed, in a large proportion of cases—caused by some abnormal or diseased condition of the nose or throat: the recognition of a nasal or nasopharyngeal abnormality is often the first step in the amelioration or cure of aural disease. In this connection adenoids may be mentioned as an instance, not only in children but also in adults: their detection at any age is a gain.

Here I may describe the two simplest tests which I consider most suitable for testing the hearing of students. These are the voice test and the watch test.

The voice test.—The practical test of hearing is the ability to hear ordinary conversation, but as the pitch and loudness of the spoken voice vary considerably in different persons and often in the same person at different times, the whispered voice, being more uniform, is more reliable as a test of hearing, provided the deafness is not so intense that the whisper is heard with difficulty or not at all.

Method.—The patient stands at one end of a quiet room with the ear to be tested towards the examiner, the other ear being stopped with the index finger. The examiner begins the test from without the range of the patient's hearing, say at a distance of about thirty feet, and gradually comes nearer until the patient repeats correctly what is spoken or whispered to him, and the distance so found is entered on the record. The spoken or the whispered voice is used according to the degree of deafness, and the record should state which method of speech is used.

If the ordinary conversational voice can be heard correctly at about twenty or thirty feet, the hearing for the voice may be considered normal. Any distance less than that indicates defect, as a rule. The whisper may be heard in a quiet room by a normal ear at about twenty feet.

The watch test.—This test is not as good as the previous one; watch-ticks are not standardised, and the hearing for the watch is no indication whatever of the hearing for conversation. Its advantage is that it can be carried on with comparative ease and hence is universally applicable.

Hold the watch beyond the point at which it is normally audible, and gradually bring it near the patient's ear. Note the distance of the watch from the ear when the patient first hears the tick. During the test the other ear must be stopped with the finger and the eyes must be closed.

The nasal affection which may cause harm to the patient may be obstructive or infective, though in many cases both are commonly present together. There may be deviation of the nasal septum, hypertrophy of the turbinal bones, polypi, or suppuration in the nasal accessory sinuses. Troubles in the middle ear, such as deafness or otorrhœa, may arise from any of these. These nasal conditions may also be factors in the causation of various local and remote symptoms. Amongst the local manifestations may be mentioned stuffiness in the nose, inability to breathe through one or the other nostril or through both, repeated attacks of coryza, offensive breath, headache, pain varying in situation and degree, purulent nasal discharge, etc. The significance of a nasal condition in the causation of headache must be kept in mind and in every such case the nose should be examined as a routine measure, which, if done, will obviate many unnecessary troubles. Here I may mention the case of a patient, a young adult, who came to me in May, 1925, complaining of frontal headache of about a year's duration. He had been under various treatments but without any improvement. Glasses had been ordered but his headache remained as before. He used to suffer from colds in the nose. On examining his nasal passages I found the left middle turbinal bone much hypertrophied. Transillumination showed the frontal sinuses and maxillary antra clear. I performed turbinectomy of the enlarged bone and ever since then he has been free from the headache. Here the turbinal bone was interfering with the proper drainage of the frontal sinus leading to increased intra-sinus pressure and consequent headache.

Regarding the remoter manifestations, gastric, respiratory, ocular, cardiac, muscular or arthritic symptoms may be complained of, and amongst the nasal affections the infected accessory sinuses are the most important factors in their causation. As illustrating these, I shall describe here the history of two patients who have been under my care.

One patient, an adult male, suffered from dyspepsia for a long time. Various methods of treatment were adopted but without any improvement. He suffered from chronic catarrh in the nose. Nothing abnormal could be found in the pharynx or the post-nasal space but on examining

the nasal passages I found yellowish-white, tenacious, pus-like discharge sticking on to the left middle turbinal bone which was also slightly enlarged and œdematous. The maxillary antra and the frontal sinuses were clear on transillumination. I thought the case to be one of ethmoidal suppuration. The hypertrophied middle turbinal was excised and the ethmoidal cells were exenterated and the cavities were disinfected with collosol argentum liquidum. The removal of the septic focus in the nose led to improvement in appetite and general health and the patient felt relief from his stomach disorder.

The second case is of interest as showing how an infection in an accessory sinus can cause evening rises of temperature, general debility, anæmia, cough and all the symptoms suggestive of pulmonary tuberculosis. No focus in the lung could be detected, still the patient, an adult female, suffered from the above symptoms. There were a few granules on the posterior wall of the pharynx but excepting these no other abnormality could be found in the pharynx and the post-nasal space. The larynx was quite normal. On examining the nasal cavities I found pus sticking on the medial surface of the right inferior turbinal bone. Transillumination revealed a dark maxillary antrum on the right side. Proof puncture and syringing brought out purulent fluid. Obviously the symptoms were the result of septic absorption from a suppurated maxillary antrum. Nasal antrostomy being refused, the right maxillary antrum was washed and disinfected with collosol argentum liquidum. The patient gradually showed signs of recovery. The evening rises of temperature dropped, cough disappeared and she put on flesh and was once again a cheerful soul.

I cite these two cases only to show the significance of a focal infection in the nasal accessory sinuses, and this should never be forgotten even when the symptoms complained of by the patient refer to distant organs. And I cannot leave this point without mentioning, nay emphasising, the relationship of a diseased sinus to defective vision. In this connection the sphenoidal sinus and the posterior ethmoidal cells must be borne in mind and disease in these is one of the most common causes of retrobulbar neuritis with defect or loss in sight. And this is easily explained when we think of the anatomical relationship between the optic nerve and the sphenoidal sinus and posterior ethmoidal cells, only a thin bony partition separating the structures, whilst the optic nerve is very sensitive to toxins. Defective vision is quite common amongst the students and in its investigation the question of the accessory sinuses should never be overlooked: here is an opportunity for the ophthalmologist and the rhinologist to work hand in hand for the common good.

Amongst the throat and naso-pharyngeal conditions diseased tonsils and adenoids are the most potent factors in causing mischief to the

person, suffering from these, in various ways. The tonsil is a collection of lymphatic tissues situated between the two pillars of the throat. In young children the tonsils are at the height of their physiological activity and they are in some measure a protection against the invasion of micro-organisms. A healthy tonsil readily absorbs the pathogenic germs and has the power to destroy them.

The tonsils are very commonly enlarged and this enlargement is due to chronic infection and is often associated with adenoid vegetations in the post-nasal space. From their very bulk the tonsils sometimes cause difficulty in swallowing and respiration. Enlarged tonsils are septic tonsils and so these patients, both children and adults, are subject to repeated attacks of tonsillitis, quinsy and pharyngitis; to laryngitis, bronchitis and asthma; to acute rheumatic fever with its bad after-effects, diseases of the heart and chorea; sometimes to acute nephritis; and even, it is said, to appendicitis and other forms of gastro-intestinal disorders. Patients with chronic tonsillitis sometimes suffer from chronic rheumatism with repeated attacks of pain in the joints and osteo-arthritis, and I have got records of two cases who were permanently cured of their pains in the joints after I had removed their diseased tonsils. The strongest indictment against the tonsil is that it is the portal of infection for tubercle bacilli, which, passing through, often leads to enlargement of the lymphatic glands in the neck and tuberculosis in them, and at times to tuberculosis in the lungs. Conditions of anæmia combined with indigestion from toxæmia, often associated with evening rises of temperature and general debility are not uncommonly seen. Various eye troubles, e.g., retro-ocular neuritis and retinitis, phlyctenular conjunctivitis, may have their ultimate source of origin in diseased tonsils, which are also the factors in the causation of middle ear disease, catarrhal or suppurative, with deafness. All these diseases can be prevented or cured if suitable remedial measures are taken at the proper time. Medical treatment may do good at the beginning, but once the tonsils are chronically enlarged nothing short of surgical interference can effect any cure or improvement: the diseased tonsils must be removed *in toto*.

The public very often ask, if the tonsils are useful organs and have some protective value, why should it be prudent to remove them. The argument is that the tonsils may be compared to forts around a city, useful at first but not when in occupation of the enemy, when, therefore, they must be destroyed. The tonsils are useful when they are healthy, but once they are diseased, they are not only not harmless and functionless but are a definite menace to health and hence must be removed.

Before advising their removal the tonsils should be properly examined. Generally these organs are examined rather carelessly and hurriedly. Simply illuminating the pharynx and

putting a tongue depressor in position will not show the tonsil fully and properly. It must be borne in mind that its surface looks towards the middle line. Much—it may be most, in some cases it will be all—of the gland is hidden behind the anterior pillar of the fauces, and at the most only its anterior part is properly seen. The correct way to examine the tonsil is to draw back the anterior pillar and so to turn the tonsil towards the observer. This can be done by making the patient “gag”—during this act the muscle in the posterior pillar contracts and lifts up the tonsil out of its bed and at the same time rotates it forwards, making the gland fully visible. Or the anterior pillar can be hooked outwards by the tip of the tongue depressor and thus the face of the tonsil can be turned forwards. Whilst this is being done pressure can be made on the gland to see the condition of the crypts and the supra-tonsillar fossa: if there is any pus in these, it will be made evident. Many diseased tonsils, especially in adults, are overlooked, simply because these little procedures are not employed.

Adenoids.—Normally there is present at birth a variable quantity of lymphoid tissue in the roof and posterior walls of the naso-pharynx. By the term “adenoids” is meant a chronic enlargement of these lymphoid tissues. The incidence of adenoids is universal and is quite common in this part of our country. Though not exactly hereditary, it is in many instances a familial disease, three or four members of a family are often found suffering from this malady. Chronic or repeated attacks of nasal catarrh are the principal factor in their causation; the infectious fevers, particularly measles, whooping cough, diphtheria and scarlet fever, are also a frequent cause of this hypertrophy.

These hypertrophied adenoid growths gradually disappear or shrink by the formation of fibrous tissue in their substance. This process, however, does not depend on the age of the patient, and is not one that must commence at or about the age of puberty, but may occur at any age: it may even be more evident in the very young child than in the adult; sometimes the adenoid growths may remain up to old age, though in many cases these atrophy and disappear by the age of twenty or thereabouts. Thus, it follows that we cannot say in any particular case that a growth may be left to disappear by itself. Because a patient is approaching puberty or adult life it does not follow that the adenoid hypertrophy will in a short time cease to exist.

These facts ought to be given a wide circulation among the medical profession because physicians too often advise their patients to “wait for puberty” as the adenoids will “shrink” by that time. This adenoid tissue is always subject to infection and the patient suffers from repeated attacks of naso-pharyngeal catarrh. So while waiting, this inflammation is ever progressing, and may and actually does, in the

majority of the cases, spread into the Eustachian tubes and middle ear, causing symptoms which may linger on throughout the whole life of the patient. So even if the adenoids shrink, their bad effects do not disappear along with them but remain behind as a permanent legacy. Need we then wait for the adenoids to shrink when we know that that event is so uncertain, and when their presence is associated with so much risks? “Waiting for adenoids to shrink is always a foolish and dangerous thing.”

The symptoms of adenoids are many and various and are secondary to (1) the liability of these growths to infection or catarrh; (2) the extension of the inflammation to neighbouring organs; (3) the obstruction they present to nasal respiration; and (4) the reflex processes attributed to irritation and lowered vitality. These patients are always suffering from “colds” and easily get “catarrh of the nose.” Their breath is often foetid and their taste and smell are often impaired. The terribly common catarrhal and suppurative affections of the middle ear, leading to deafness if long-continued and neglected, are in an overwhelming majority of cases the result of adenoids. The presence of a chain of slightly enlarged lymphatic glands along the posterior border of the sternomastoid muscles is an almost constant sign of a mild infection of the pharyngeal tonsil. Sometimes these glands attain quite a large size and are often associated with slight rises in the evening temperature. Tuberculosis of the glands is usually due to the passage of the tubercle bacilli through these portals, i.e., the adenoids, and tubercle bacilli may enter the whole system after primarily infecting the lymphoid tissue. Slight bleeding from the nose (epistaxis) is quite a common symptom and is due to congestion of the naso-pharyngeal adenoid tissue. Owing to the same cause bleeding may occur into the throat and if to this, slight evening rises of temperature, cough and general malnutrition are added, the clinical picture of tuberculosis is very much suggested. Looking back into my case notes I can find the records of several cases in young adults who have been permanently cured of their symptoms by the removal of adenoids.

The inflammation from the naso-pharynx may spread to the larynx causing laryngitis, spasm of the glottis and hoarseness; to the trachea and bronchi causing bronchitis and possibly asthma, and leading along with the nasal obstruction to round shoulders, flat chest and depressed lower costal cartilages. Adenoid subjects are mouth-breathers and they snore at night. Restlessness during the night is a prominent symptom. Persistent nasal obstruction during the period of growth leads to some deformities in the jaws and face, the person having a dull, vacant and expressionless face or what is known as “adenoid facies” or “rabbit-shaped face.” They suffer from chronic anæmia and malnutrition and their bodily development is poor. Their mental faculties are often much impaired. They are

inattentive, possibly because they suffer more or less from deafness, and they cannot concentrate their attention on anything for a long time. Defective speech is a symptom of considerable diagnostic and economic significance. The voice is muffled and articulation is thick and imperfect.

How to detect the adenoids? This can easily be done if the attending surgeon uses his special senses. On inspection he will notice the open mouth, thick, everted lower lip, and dull, vacant and expressionless face. If the case has gone on for years deformed chest may also be evident. The post-nasal mirror will show the dark-red growths in the naso-pharynx. By the sense of touch the surgeon will feel with his finger the soft, velvety masses occupying the roof and posterior wall—and it may be, also the upper part of the lateral wall of the naso-pharynx. The olfactory senses will appreciate the foetid odour of the patient's breath while the auditory sense will detect, in some cases at least, the peculiar muffled character of the voice.

What is the treatment of these adenoid growths? "There is but one treatment worthy of the name, and that is the surgical removal of the growth (i.e., adenoids). Astringent applications have been and are still advocated by some writers, but in my opinion their use is but a means to postpone the day when their removal must take place. I can conceive how a congestion and inflammation of the lymphoid masses might be relieved and greatly improved by the local use of alkaline and astringent washes, but when true hypertrophy has occurred the curette offers the best means of treatment."

The improvement in the mental development after operation is often marvellous, provided the operation is done sufficiently early in life, but if this is delayed until the individual has attained full growth, the mind will rarely develop so well as it would have done had the operation been performed at an earlier period. The general health rarely improves and the person is always ailing so long as adenoids remain. If, however, these are removed, the general toxæmia disappears, the blood becomes oxygenated and red and all the vital energies are quickened and increased. The dull "adenoid facies" improves somewhat with advancing years, though it often remains as a permanent disfigurement. In fine, the early removal of adenoids often prevents serious aural diseases, improves the general health, and beautifies the face.

Persons with diseased tonsils and adenoids are very subject to the infectious diseases, e.g., measles, influenza, diphtheria, scarlet fever, etc. The public may think that the removal of these lymphatic tissues, which have some protective functions, will render the individuals more susceptible to infections but experience shows that this is not the case. The resistance to infections possessed by the individual in whom diseased tonsils and adenoids have been removed is certainly not lowered but is rather increased by the removal of the septic focus. Investigations in the

London County Council Schools as to the relation of tonsils and adenoids to the incidence of scarlet fever and other infectious diseases were made some years ago, and it was found that (1) cases of enlarged tonsils and adenoids provided the largest number of cases of infectious diseases; (2) persons who never had enlarged tonsils and adenoids came next; (3) the least frequent were those who had had tonsils and adenoids removed. The conclusion seemed to be that the frequency was decreased by removal.

I have attempted to write, briefly, about the significance of the commonest of the ear, nose and throat diseases; enlarged tonsils and adenoids stand most prominent amongst these. The treatment of these latter is entirely surgical. The public in India have a peculiar dread of surgery and cannot tolerate the idea of their children being subjected to a surgical operation and instead stuff them with syrup ferri iodide and cod-liver oil and use every known variety of gargle and paint, though deriving no benefit from these. I must confess I cannot sympathise with this attitude, fine in itself but cruel in its results; in my experience hard heads contain more real kindness than soft hearts. It is generally forgotten that the tonsils and adenoids are at the very gates through which all sorts of disease germs enter the body. Just as one's treasures are never safe unless the gates of the house are well secured, so unless the throat and nose are perfectly healthy and well-toned, one never knows when disease may not enter the body stealthily and rob the patient of health, the greatest of all treasures. Before making a decision one may naturally ask if there are any risks attending such an operation. Complications, such as septic infection of the wounds leading to troubles in the ear and hæmorrhage occur only very rarely indeed, and with proper precautionary measures the chances of their occurrence can be reduced almost to nil. If I may be permitted to speak from my personal experience, I may say that during the last nine years that I have been doing ear, nose and throat work—both in England and in India—I have operated on several hundreds of cases of enlarged tonsils and adenoids, and not one case even has suffered from any septic complication and I had to interfere in only one patient for slight bleeding which occurred on the fourth day after the operation and stopped on the application of tincture perchloride of iron. And I have not had a single fatality. This will show how baseless are the fears entertained against these operations.

The Calcutta University Students' Welfare Scheme is an important institution and it can do really useful work. The students are the young "hopefuls" of the nation and it is a national problem to investigate their health, to find out their defects and disabilities and to correct these by suitable remedial measures. As has been mentioned before, ear, nose and throat diseases are very much neglected in our country and these are allowed to progress till in most cases it

becomes too late for any successful treatment. The responsibility for this state of affairs rests both with the public and the medical men. The ignorance of the public with regard to the health of their children must be removed and with a view to educate them in this matter propaganda work, in the form of lantern lectures, etc., showing the signs and effects of these diseases, may be arranged. A system of *school* medical examination should be adopted. Every boy should be examined once on admission into the school, say, at the age of six, and secondly, when the student is twelve years old, and after that according as the boy's health necessitates him to be medically examined. There should be a service of school medical officers to undertake this work and to look after the health of the students generally. When a student is found suffering from any disability he should be referred to his family physician or to the specialist for necessary treatment. The care that is taken of the children in the schools is impressed upon the parents and they learn to regard a high standard of health as of value. In order to equip the general medical practitioner for this special work the following suggestions may be recommended:—(a) compulsory training with examination of the medical student in ear, nose and throat diseases; (b) establishment of a lectureship in the subject in the medical colleges; (c) appointment of an ear, nose and throat surgeon on the visiting staff of all teaching hospitals. In addition to an out-patient department, there should be a few special beds in every such hospital for these diseases, as there are for ophthalmic and children's diseases, so that medical students may get instruction in every variety of such cases from the special surgeon.

If these suggestions are acceptable to the Student's Welfare Committee, they may request the University authorities to adopt necessary measures and to instruct the medical colleges accordingly.

REDUCING SUBSTANCES IN THE URINE: THEIR DETECTION AND IDENTIFICATION.

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WHEN glucose is present in the urine in abnormal amounts its detection by any of the well-known tests is a simple matter. It is only when sugar is present in minute quantities that difficulty is experienced in its detection by one or other of the ordinary tests. It may be noted that Fehling's test is generally used and still considered by many to be practically infallible for the detection of sugar in the urine. But the fact that many substances other than glucose, often present in the urine, contribute to the reduction of the copper solution must not be lost sight of. It may further be observed that Fehling's test often gives fallacious results for

reasons which I shall deal with presently. In doubtful cases, therefore, it is always advisable to apply other tests such as Benedict's, Nylander's, the osazone test and polarimetric examination for confirmation or otherwise of the results obtained by Fehling's test. The object of this paper is to state briefly the nature of these reducing substances in the urine, the conditions under which they appear in it, and modes of differentiating them from glucose.

At St. Bartholomew's Hospital I conducted an investigation into the nature of these reducing substances in the urine in collaboration with Dr. Mackenzie Wallis, and we tried to find out a method by which we could remove these interfering substances from the urine and estimate the actual amount of glucose present in normal urine. We systematically applied all the classical tests I have mentioned above to every doubtful sample of urine that was sent to us, and on the findings of these tests we were able in most cases to decide definitely whether an abnormal amount of sugar was present in the sample or not. There were, however, instances when a sample of urine was found to give indefinite reductions by both Fehling's and Benedict's tests but yielded definite results by the osazone test. The question arises as to whether such cases are cases of true glycosuria or not. The determination of this point is often of great practical importance, not only for diagnostic purposes, and especially in cases of life insurance examinations, but also for the right interpretation of the glucose-tolerance test or in observing the effects of treatment. We also wanted to find out the line of demarcation, if any, between the normal sugar content of the urine (glycuresis of Benedict) and clinical glycosuria. This subject has attracted the attention of several observers for many years and it is beset with difficulties. The chief disturbing factor in all the methods which we tried was the presence of creatinine. In the method which we have now found, practically all the difficulties encountered have been overcome. The precipitating reagent which we have found to answer the purpose throws down all the creatinine from the urine, all the pigments, the greater part of the uric acid, urea and other interfering substances. Briefly, the method is as follows:—

REAGENTS AND APPARATUS REQUIRED.

(1) Boiling tubes of resistance glass with graduation marks at 12.5 and 25 c.c. The lower end of the tube is provided with a bulb of 4 c.c. capacity and a narrow neck above, 2 cm. in length and not more than 8 mm. in diameter. The bulb is designed to hold the mixture of the urinary filtrate and copper solution and the constricted neck serves to prevent reoxidation of the copper oxide by reducing the volume of the liquid exposed to the air in the tube above.

(2) A boiling water-bath with holes of a suitable size to hold the special boiling tubes in an upright position.

(3) Ostwald pipettes of 1 c.c. capacity.

(4) An alkaline copper solution made up as follows:—

Anhydrous sodium carbonate .. 40 grammes.
Tartaric acid .. 7.5 grammes.
Crystalline copper sulphate .. 4.5 grammes.
made up to a litre.

(5) Urinary precipitant.

Five grammes of pure phosphotungstic acid are placed in a 250 c.c. flask and dissolved in hot distilled water, 100 c.c. being used for the purpose. To this solution 12 c.c. of concentrated sulphuric acid (98 per cent.) is added drop by drop. When cool it is made up to the mark, filtered and stocked in amber-coloured bottles.

(6) Phospho-molybdic acid solution.

This is prepared by dissolving 35 grammes of pure molybdic acid (free from ammonia) in 200 c.c. of 10 per cent. NaOH. To this add 200 c.c. of distilled water and boil till all traces of ammonia are removed. Cool and then add 125 c.c. of phosphoric acid (85 per cent. strength) and finally make up in a 500 c.c. flask to the mark with distilled water. The solution should be of such a strength that 2 c.c. will completely discharge the blue colour from 2 c.c. of the copper solution.

(7) Standard 1 per cent. glucose solution. This is kept in the refrigerator and the fresh standard solution is made up each time by diluting 1 c.c. of this stock solution up to 50 c.c. in a measuring flask. Each c.c. of this standard solution contains 0.2 milligrammes of glucose.

(8) A good colorimeter, preferably of Kober type. The plungers in this instrument are fixed and the cups are movable. The sides of the plungers are of black glass as also the side of the cups and thus there is no space between the fluids and the prisms to allow of extraneous sources of light which introduce errors into instruments like the Duboscq colorimeter. Another advantage of the Kober instrument is that the standard solution can be fixed at any point and moved in relation to the unknown solution, thus enabling both strong and weak coloured to be compared with ease and accuracy. The depth of colour is proportional to the amount of sugar present and if the amount of sugar in one cup is known then the amount of sugar in the unknown can be easily calculated.

The estimation is carried out as follows:— Into a test tube measure out 1 c.c. of the urine by means of the Ostwald pipette and then add 2 c.c. of the sulphuric phospho-tungstic acid mixture. A dense precipitate appears of a reddish violet colour. The precipitate contains the creatinine, uric acid, urochrome and other pigments. Shake the test tube and then add 7 c.c. of distilled water to make the volume up to 10 c.c. Filter through a starch-free filter paper into a clean dry test tube.

1 c.c. of the clear filtrate is measured by means of an Ostwald pipette and placed in one of the special boiling tubes, and 2 c.c. of the alkaline

copper solution added. In another boiling tube place 1 c.c. of the diluted standard glucose solution and add 2 c.c. of the alkaline copper solution. To ensure mixing gently tap the bulb against the palm of the hand.

The two tubes are now inserted into a boiling water-bath and allowed to remain for exactly 6 minutes. They are then removed from the bath and 2 c.c. of phospho-molybdic acid solution added to each. A brisk effervescence occurs and in the presence of sugar a deep blue colour results, the depth of the colour depending on the amount of sugar present. The contents of both the standard and the unknown are now diluted with distilled water to the 12.5 c.c. mark and thoroughly mixed. The solutions are now placed in the two black cups and compared in the colorimeter.

Calculation.—Amount of urine taken = 0.1 c.c. (1 c.c. of 1 in 10).

Amount of glucoside present in standard = 0.2 mgm.

$$\frac{\text{Reading of standard}}{\text{Reading of unknown}} \times \frac{0.2 \times 100}{0.1} = x \%$$

By this method the sugar in normal urine was found to vary in amount between 0.06 to 0.09 grammes per cent., and in 24 hours the total excretion of sugar by a healthy normal individual was found to be about 1 gramme.

Let us now discuss the merits and demerits of some of the common classical tests for the detection of abnormal amounts of sugar in the urine:—

Fehling's test.—Fallacies in Fehling's reaction are attributable to the following causes:—

(a) Some of the normal constituents of the urine such as uric acid, creatinine, etc., when present in excess reduce it.

(b) Sodium hydroxide when present in excess destroys small amounts of glucose.

(c) Conjugated glycuronates are hydrolyzed to reducing substances by NaOH.

(d) Lactose, which is often a normal constituent of the urine in women in the lactating period, also reduces Fehling's solution.

The same is true of pentoses, which, however, are rarely found in urine.

(e) The urea of the urine is sometimes converted into ammonia which dissolves the cuprous oxide and interferes with the delicacy of the test.

(f) Certain drugs eliminated by the kidneys such as chloral, copaiba, chloroform, benzoic acid, morphine, sulphonal, salicylates, etc., have a reducing action on Fehling's solution.

Benedict's test.—This is a comparatively recent test and has at present displaced nearly all other reduction tests for sugar. The substitution of sodium hydroxide by sodium carbonate overcomes the difficulties noted under the first three heads of the Fehling's test, as, urates, creatinine and conjugated glycuronates do not reduce copper in its presence. Then again the use of sodium citrate in Benedict's solution in

place of Rochelle salt renders the mixed solution perfectly stable, and it is always convenient to use one solution in place of two.

Another advantage of this test is that it at once tells us the approximate percentage of sugar in the urine from the character of the precipitate formed. Thus, if on boiling 5 c.c. of Benedict's solution with 8 drops of urine we get a light-green opacity, the sugar content is probably 0.1 per cent. If there is a green precipitate, the sugar content is between 0.1 per cent. to 0.5 per cent. In the case of a yellow precipitate, the sugar content is between 0.5 to 2 per cent. and in the case of a red precipitate it is 2 per cent. or over.

To a busy practitioner this test is of great value as it readily gives him a rough idea of the amount of sugar his patient is passing.

Benedict's test, however, does not exclude sugars other than glucose.

Nylander's test.—This test is a valuable negative test, a negative result indicating absence of glycosuria. But if a positive result is obtained it may be due either to glucose or some other substances as well. For this reason the positive results cannot be absolutely relied upon.

The fermentation test.—This test depends upon the fact that glucose is fermented by yeast with evolution of CO_2 and production of alcohol. The most convenient method of applying this test is to use one of the small Einhorn fermentation tubes which is so graduated as to give a reading of the percentage of sugar from the bulk of the CO_2 evolved.

Maltose and lævulose, if present in the urine, are also fermented by the yeast. Lactose is not fermented during the first 24 hours and glycuronic acid is not at all fermented by yeast. This is, therefore, a very reliable test for excluding reducing substances other than sugars.

The phenyl-hydrazin test.—This is a very reliable test for detection and identification of the different kinds of sugars which may be present in the urine. It may be noted that small quantities of iso-maltase, said to be present in normal urine do not yield crystals of phenyl-maltasazone. Glycuronates and lactose do not furnish crystals by this test under ordinary conditions. So that when properly carried out this is one of the best tests for identification of glucose in the urine. Although lævulose gives an osazone identical with phenyl-glucosazone, the two may be differentiated by the determination of their melting points. Crystals of phenyl-maltasazone can be distinguished microscopically by the fact that its yellow needles are shorter in length but much broader than those of phenyl-glucosazone.

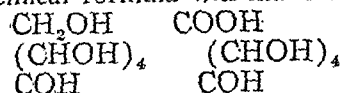
Polarimetric determination. Before polarization the urine must be freed from proteins, uric acid, phosphates and colouring matters by precipitation with basic lead acetate.

The polarimeter indicating the different specific rotatory powers, dextro or lævo, of the various kinds of sugars helps to determine the particular one present in the urine. Thus glucose

has a specific rotatory power of $+52.7^\circ$; lævulose -93° ; lactose $+55^\circ$; maltose $+138^\circ$, etc. If, however, more than one sugar is present in the urine, polarimetric examination does not help us very much.

Let us now pass on to the consideration of some of the important abnormal constituents of urine which, acting as reducing agents, may be mistaken for sugar.

(1) *Glycuronic acid.*—It is closely related chemically to dextrose. The mode of its origin in the animal organism is believed to be due to partial oxidation of glucose. An inspection of their chemical formula will make the point clear.



(Glucose) (Glycuronic acid)

A substitution of an atom of oxygen for two of hydrogen in the first group will produce glycuronic acid.

It is supposed that glycuronic acid combines with the putrefactive bodies in the intestines as the sulphates do, and also with administered drugs such as chloral, morphia, antipyrin, antifebrin, pyramidon and is eliminated as conjugated glycuronates in the urine. Its function in this connection appears to be antidotal, the conjugated acids being harmless. The presence of conjugated glycuronic acid in the urine in abundance may thus be regarded as an effort of the system to overcome intoxication by combining with these toxic substances. In fact an increase of glycuronates in the urine is regarded by many as an important factor in the diagnosis of intestinal intoxication.

It has been shown by Myers and Neuberg that traces of glycuronic acid are present in normal urine in the form of phenol and indoxyl glycuronates. It has also been shown that glycuronic acid is a constituent of normal blood.

An increased amount of conjugated glycuronic acid is not only found in the urine of persons suffering from intestinal toxæmia but also in cases of chronic heart disease where the oxidising powers of the body is markedly reduced. In all these conditions it is quite probable that the increased production of the acid is due to an increased formation of indol and other aromatic bodies in the intestine, and it may be taken as an effort on the part of the organism to neutralize the toxic effects by conjugation with glycuronic acid. It is interesting to note that the ethereal sulphates, mainly excreted as indican, are also increased in such cases.

Diabetic urine not infrequently contains appreciable quantities of conjugate glycuronates, as is evidenced by the fact that after the glucose has been removed by fermentation, polarimetric examination will reveal a slight lævo-rotation. This lævo-rotation may also be due to oxybutyric acid which, however, is not precipitated by lead acetate whereas glycuronic acid is. So if lævo-rotation appears in the lead acetate filtrate it must be due to oxybutyric acid.

Tests for glycuronic acid.—The glycuronates give the same reactions as the pentoses. So Bial's test which is fairly reliable for pentoses cannot be fully depended upon when pentoses are present in the urine as well.

Bial's reagent is composed of 500 c.c. of strong HCl, 1 gramme of orcin and 25 drops of a 10 per cent. ferric chloride.

To do the test 5 c.c. of this reagent and 3 c.c. of the urine to be tested are placed in a test tube and heated to 95°C. over the flame till bubbles begin to rise, but not exactly to boiling stage. If a green precipitate is formed on cooling the presence of pentoses is suspected. If we further dissolve this precipitate in amyl alcohol and if spectroscopic examination shows characteristic absorption bands between the lines C and D, the presence of pentoses is confirmed.

If, however, the urine and the reagent have to be boiled for some time to get the reaction, it is probably due to glycuronic acid or conjugated glycuronates.

The phenyl-hydrazin test.—Glycuronic acid or conjugated glycuronates do not form an osazone by the ordinary method of heating on a water-bath for a short time. An osazone may, however, be formed by heating urine containing glycuronic acid with phenyl-hydrazin and glacial acetic acid for several days in an incubator at 40°C. The crystals so formed show as bundles of yellow needles with a melting point of 200 to 205°C.

Neuberg's test.—This is the most trustworthy test for identification of glycuronic acid.

The urine to be examined is heated in an autoclave for one to two hours at about 115°C. with sufficient sulphuric or phosphoric acid so that the fluid contains 1 to 2 per cent. After cooling the mixture is neutralized with sodium carbonate and immediately acidified with acetic acid and filtered: 250 c.c. of the filtrate is mixed with a hot aqueous solution of 5 grammes of para-bromophenyl-hydrazin hydrochloride and 6 grammes of sodium acetate. The mixture becomes cloudy after the addition of the reagent but on further heating the cloud disappears and in 5 to 10 minutes needle-shaped crystals are formed. The fluid should be allowed to cool and the crystals filtered off. The filtrate is again heated and after cooling a second crop of crystals is obtained. This process is repeated five times. The collected crystals are washed with absolute alcohol and then recrystallized several times from 60 per cent. alcohol in which they are soluble. The melting point of these para-bromophenyl-hydrazin crystals is 236°C. Besides the melting point the lævo-rotation of the osazone when in solution may also be taken as a proof of the presence of glycuronic acid.

(2) *Alkaptonuria.*—The presence of alkapton acids in the urine causes reduction in Fehling's solution, like sugar. Such urines when exposed to air and light turn black, especially if rendered alkaline. Alkaptonuria, according to Sir Achibald Garrod, "is not the manifestation of a

disease but is rather of the nature of an alternative course of metabolism, harmless and usually congenital and lifelong." Garrod thinks that persons suffering from alkaptonuria seem to be unable to break down the tyrosine in the protein molecule completely so that the intermediate product, homogentisic acid, appears in the urine.

These persons are usually healthy, though blackening of the cartilages and ligaments (ochronosis) and a progressive articular disease are seen in a few. Alkaptonuria, however, is a rare phenomenon.

The importance of recognising the presence of these acids in the urine lies in the fact that persons suffering from this disorder are often refused by life insurance companies, being supposed to have diabetes because of the marked reducing action of the alkapton acids on Fehling's solution.

To eliminate the fallacy one or other of the tests such as Nylander's, fermentation with yeast, the phenyl-hydrazin test and polarimetric examinations should be done. All of these will give negative results in the case of glycuronic acid. Secondly, when a dilute solution of ferric chloride is allowed to fall drop by drop into urine containing glycuronic acid each drop produces a transitory deep blue colour.

Garrod's test.—The urine is heated to boiling: 5 grammes of neutral lead acetate is added to each 100 c.c. of urine when a greyish precipitate is formed. This is filtered off and the filtrate kept in a cool place for 24 hours. If homogentisic acid is present it will separate out in combination with lead in a crystalline form.

The acid may be set free from the lead salt by suspending 5 grammes of the finely produced salt in 50 c.c. of ether and passing H₂S through. After filtering off the lead sulphide the ether is evaporated and crystals of the pure acid separate out and have a melting point of 147°C.

I shall now pass on to the consideration of the presence of sugars other than glucose in the urine, the causes of their appearance, and the tests by which they may be distinguished from one another. First:—

(1) *Lævulosemia.*—Lævulose is more frequently found in the urine of severe diabetics than is ordinarily supposed. The appearance of lævulose in the urine of diabetics is considered to be a bad sign. Diabetic patients as a rule can tolerate small amounts of lævulose, even when their power of assimilating glucose is practically lost. The explanation usually given is that the liver and the muscles can form glycogen much more easily from lævulose than from glucose and hence the former can be kept in store in the liver while the latter passes through into the general circulation.

It has been found by experiment that if we give 25 grammes of lævulose to a healthy normal individual and if we examine the blood for evidence of sugar at intervals of 15 minutes up to one hour, there is no rise in the blood-sugar at all. Whereas, if we repeat the same experiment

with the same amount of glucose there is a sharp rise in the blood-sugar content, which attains a maximum in half an hour but comes down to normal level in the course of an hour to an hour and a half.

The explanation usually put forward is that lævulose is at once taken up by the tissues and utilised, whereas a longer time is required for the utilisation of glucose, which thus lingers in the circulation.

It has been found, however, that in about 85 per cent. of persons suffering from diseases of the liver, the administration of a similar amount of lævulose is followed by a sharp rise in the blood-sugar in about 15 minutes to half an hour, gradually coming down at the end of the hour and followed by a marked lævulosuria. The lævulose-tolerance test, i.e., giving an individual 25 grammes of lævulose and estimating the blood-sugar 15 minutes, half an hour and one hour afterwards, has thus become very valuable for testing the functions of the liver. If the liver function is normal, there should be no rise in the blood-sugar at all, but if the liver function is inefficient, there will be a sharp rise as I have indicated above. I have done a very large number of liver function tests both in normal individuals and also in diseases of the liver such as cirrhosis, carcinoma, novarsenobillon poisoning, and have found the test to give very satisfactory indications of hepatic functions and adequacy.

Special test for lævulose.—To a few c.c. of urine in a test tube add an equal volume of 25 per cent. hydrochloric acid and a speck or two of resorcin. Heat to boiling, cool under the tap and transfer to an evaporating dish. Make the reaction alkaline by means of solid sodium hydroxide and return to a test tube. Add 3 c.c. of acetic ether (ethyl acetate) and shake. A yellow colouration in the acetic ether indicates the presence of lævulose.

(2) *Lactosuria.*—As I previously mentioned, lactose is often found in the urine of some women after childbirth. The sugar most frequently makes its appearance in the first few days after childbirth and in some cases it may continue to be present in the urine for a number of months after. Lactosuria is often most common about the third or fourth month after delivery.

Lactosuria is more common in women who do not nurse their babies. In women who nurse their children lactosuria may or may not appear, but if for any reason nursing is interrupted considerable quantities of lactose appear. The recognition of the presence of lactose in the urine in such cases is thus very important as an incorrect diagnosis of diabetes, based upon the discovery of a reducing sugar in the urine, is often made.

The reason why lactose appears in the urine of women in the post-partum period is due to the fact that it is absorbed into the blood directly from the secreting glands of the breast and

immediately excreted by the kidneys unchanged.

Tests.—Lactose in the urine can be differentiated from glucose by the fermentation test—preferably made with a pure culture of yeast. If a prompt fermentation takes place the sugar is presumably glucose or lævulose. If now we take a further sample and make a polariscopic examination a dextro-rotation will indicate the presence of glucose but a lævo-rotation will indicate the presence of lævulose.

If, however, no fermentation takes place by the pure culture of yeast, the presence of lactose or pentose is indicated. The latter, however, can be excluded by Bial's test.

The phenyl-hydrazin test.—As previously mentioned, lactose in the urine does not furnish a lactosazone by the ordinary method of carrying out the test. If, however, the specimen is concentrated and the residue extracted by heating with a considerable quantity of alcohol and then filtering and allowing the fluid to evaporate at room temperature, a relatively pure sugar will be obtained which gives a lactosazone which has a melting point of 200°C. The crystals are quite peculiar in shape, looking like tufts of silk threads.

(3) *Maltosuria.*—According to some observers in a good many cases of diseases of the pancreas—chiefly those with interstitial lesions—maltose has been detected in the urine. Rosenheim has reported a few cases of interstitial pancreatitis in which he got definite signs of maltosuria varying from 0.1 to 0.5 per cent.

It has also been shown that complete removal of the pancreas in dogs is accompanied by the excretion of maltose as well as of glucose.

Tests.—(1) Maltose, as I have mentioned before, yields typical phenyl-maltosazone crystals having a melting point of 207°C.

(2) Maltose will not reduce Barfoed's reagent (copper acetate); whereas the monosaccharids (glucose, lævulose, etc.), will.

(4) *Pentosuria.*—Pentoses, such as arabinose, xylose, rhamnose, etc., are carbohydrates containing 5 atoms of carbon in their molecules. Of these the arabinose variety is that most commonly found in the urine.

Pentoses make their appearance in the urine under three conditions:—(1) alimentary, (2) persistent or true pentosuria, and (3) mixed with glucose in cases of diabetes.

(1) *Alimentary pentosuria.*—This is sometimes seen after the ingestion of considerable quantities of certain fruits such as apples, cherries, pears, grapes, plums, etc. It has also been found in the urine of persons who drink beer heavily.

(2) *True pentosuria,* not depending upon the intake of large quantities of sugar, has also been described. These patients gave no symptom referable to diabetes. Some of them were victims to the morphia habit or were neurasthenics. Brat has reported two interesting cases in which a brother and sister suffered from

pentosuria. Bial has also reported three members of the same family as suffering from this disorder of metabolism. There is no record of any deaths from pentosuria and the pathology of the condition is still obscure.

(3) Traces of pentose have been demonstrated in the urine of a number of severe diabetic cases. It is not known whether the association of pentoses with glucose in the urine adds in any way to the severity of the case, as that of *lævulose* is supposed to do. It is believed that the deficient power of the tissues to oxidise glucose applies to pentoses as well.

TESTS FOR PENTOSE.

Tollens' test.—To 5 c.c. of urine add an equal volume of strong HCl and a little phloroglucin and heat the mixture on a boiling water-bath. A cherry red colour develops and the solution shows an absorption band between D and E. On cooling, a dark precipitate separates out which dissolves in strong alcohol, and this solution shews the colour and absorption band of the original mixture.

Bial's orcin test for pentoses has already been described.

A Mirror of Hospital Practice.

A CASE OF COBRA-BITE.

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CAPTAIN, I.M.S.,

Superintendent, Central Mental Hospital, Yeravda.

THE patient, a man named Mahadu Bala who is an insane patient in this Mental Hospital at 4 P.M. on 3rd December, 1925, saw a snake crossing one of the garden paths. He immediately rushed at it and seized it by the tail; the snake turned around and appeared to bite him, but he retained his hold and managed to grasp it firmly behind the head. Holding it in this manner he then threatened several of the patients, overseers and male nurses who naturally enough gave him a wide berth. The overseers and nurses tried every kind of persuasion to get him to release the snake, but he would listen to no one and for about twenty minutes ran about the grounds with the snake in his hand attempting to throw it on others. He now picked up a stone of moderate size and attempted to force it into the reptile's mouth, still retaining a firm grasp of it behind the head. Finally after creating considerable alarm he released it by throwing it on the ground. It was immediately killed and was identified as a cobra (*Naja tripudians*) 3 ft. 7 in. long. The soft parts of the mouth were considerably damaged by the stone which had been forced into its mouth and one of the poison fangs was broken off. As soon as he had released the snake the patient sat on the ground

and vomited and now showed that he had been bitten on two separate places on the left hand—one on the dorsum of the hand and the other on the outer aspect of the thumb.

At 4-30 P.M. a tourniquet was applied above the elbow, 40 c.c. of antivenene was given intravenously, and the punctures were incised and potassium permanganate crystals rubbed into the incisions.

5 P.M.—Sputum viscid, the patient using the fingers to clear it from the lips; complains of great pain in the arm and very restless—tossing about in bed.

5-15 P.M.—Speech becoming thick; pain severe in arm, asking to have the tourniquet removed.

Twenty grs. of calcium chloride given intravenously in 10 c.c. of water.

5-20 P.M.—Antivenene 10 c.c. given intravenously; it was intended to give 40 c.c. but the capsule broke in filling the syringe.

5-25 P.M.—Eyelids drooping; speech very thick, almost impossible to understand what he says; making signs to have the tourniquet removed.

6 P.M.—Unable to speak—very restless—pain in the arm very severe, sputum very thick and sticks to his lips and fingers. Makes signs instead of speaking. Well marked ptosis; commencing weakness in legs; drank a little water with difficulty and was given atropine sulphate grs. 1/50 hypodermically.

6-20 P.M.—Made signs for more water, but on attempting to drink it he indicated that it would not go down and the fluid returned through the nose. Pituitary extract 1 c.c. was given hypodermically.

6-30 P.M.—Insisted on getting up; he walked in a staggering manner to the latrine and passed a motion. The gait was very feeble and he dragged his toes.

6-45 P.M.—Antivenene 40 c.c. intravenously.

7 P.M.—Speech very bad, consisting only of a few sounds in the throat; not so restless, but respiration rapid.

8 P.M.—Speech still unintelligible; made another attempt to drink, but the fluid returned through nose as before.

9 P.M.—Speech improving, but not yet able to articulate. Drank water successfully.

10 P.M.—Asked for and ate an orange.

11 P.M.—Asked for tea and bread which he ate.

12 MIDNIGHT.—Can now speak quite distinctly. From now onwards he improved rapidly, but did not sleep at all the whole night. The pain in the hand became very severe in the early morning and at 10 A.M. on the 4th December, 1925, his temperature was 102°F., pulse 118.

During the next six days he ran a septic temperature. A large slough formed over the dorsum of the left hand and eventually all the long extensor tendons sloughed away for some 3 inches of their length. The hand became very septic and pus formation extended under the skin of the forearm up to the elbow. A long incision had to be made along the extensor aspect of the forearm to give exit to the pus. He had eusol baths twice daily and soon the parts began to granulate in a healthy manner.

On 20th January, 1926, the forearm had healed completely, but a portion of the dorsum of the hand was still open, but the skin was covering the granulations at a surprisingly rapid rate.

On 1st February, 1926, the wound on the dorsum was almost healed and no skin grafting was required. The fingers remained stiff and in extension.

An interesting point of the case is the fact that the man's mental condition has greatly improved, but I think it is merely a temporary improvement.

A CASE OF RECOVERY AFTER BITE BY A RUSSELL'S VIPER.

By K. V. RAJU,

M. & S. M. Railway Hospital, Guntakal.

C. A., a watchman, was bitten at 7 P.M. on the 29th December 1925, by a snake, on the right ankle which was bare at the time, and his friends brought him to hospital for admission. They also killed the snake which bit him, and brought it for identification. The snake was a Russell's viper, $2\frac{1}{2}$ feet in length.

The patient was admitted some 15 minutes after having been bitten. His condition on admission was anything but cheerful, as he was terrified of impending death. His friends, one and all, had collected around the patient and sympathised with him on his fatal misfortune, so that he was far from optimistic. Major Acton, in his lectures on snake-bite, used to say that some deaths from snake-bite were due solely to fear and shock, and with this comment in my mind, I tried to reassure the patient that the snake was not a lethal one, but he refused to be comforted.

On admission, he complained, amongst other matters, of acute pain in the part bitten—the right ankle,—tingling throughout the right leg, heaviness of the same limb, a sense of suffocation, an urgent inclination to vomit, and a fluttering sensation in the chest. His body was cold and clammy; temperature 98°F. , pulse 74—but feeble, respiration 13 p.m. He also complained of dryness of the tongue and thirst.

Having identified the snake, I immediately injected 35 c.c. of Kasauli antivenene intravenously. Locally at the site of the bite, I made a deep incision into the part bitten—which shewed clearly three fang puncture marks,—and cauterised the part with pure carbolic acid. The part was then bandaged.

At 9-30 the same evening the patient was better in every way, but complained of extreme pain in the back and shivering; his temperature had risen to 101°F. ,—probably as a result of reaction from shock. The subsequent course of the case was as follows:—

30th December.—Has slept well. Right ankle still very swollen and painful. Wound clean. Some fever— 101.2°F. —present, with accelerated pulse, 112.

31st December.—Much improved. As he has now survived 36 hours after the bite, his outlook is much more optimistic. Ankle still swollen and with a sanious discharge. Saline dressings applied.

1st January, 1926.—Very much better; discharged from hospital, and subsequently seen as an out-patient. Can now limp.

2nd January to 6th January.—Was seen each morning in out-patients, and walks daily half

a mile to and from the hospital. Wound healthy, but the ankle is still swollen.

7th January.—Lotio plumbi subacetatis dressings applied.

9th January.—Wound completely healed. The patient is now completely cured.

REMARKS.

(1) The immediate administration of antivenene intravenously appeared to have been an important element in his recovery; a second dose was not indicated, on carefully watching his symptoms.

(2) The local swelling and oozing of hæmolyzed blood was a marked feature of the case,—presumably owing to the thrombotic and hæmorrhagic action of the venom. Pain was a marked feature of the case. No subsequent gangrene was evident.

(3) The early symptoms were those of shock, probably due to fright and not to the action of the venom.

(4) Although three fang puncture marks were clearly visible, it is not certain that the viper had given a lethal dose of venom. On the other hand, the immediate administration of antivenene intravenously may have helped to save life. Had the patient been seen after a longer interval, a much larger dose of antivenene would probably have been required.

In conclusion, I desire to express my thanks to Dr. R. J. Dyson, District Medical Officer, for kind permission to publish the notes on this case, and to Dr. N. G. Rao, my colleague, for assistance with the patient.

A MURDER UNDER INSANE HALLUCINATION.

By Dr. SARASI LAL SARKAR,

Civil Surgeon, Noakhali.

THE modern development of psycho-pathology has revolutionised our former conceptions about insanity. The modern, present-day and intensive study of insane acts discloses the fact that terrible crimes, such as murder, are not really the motiveless acts that they often appear to be. The motive is there, but buried in the sub-conscious mind. The following case illustrates this:—

A young Sonthal, by name Supol, was brought to the Noakhali sub-jail for murdering in the street, without any apparent motive, a young Mahomedan boy, who was entirely unknown to him, and whom he then saw for the first time in his life. On examination, his general health was good, and there was no evidence of any organic or nervous system disease. His general demeanour, however, was that of a very absent-minded person, with vacant look, unconcerned as to his surroundings, yet answering questions truthfully, straight-forwardly and without circumlocution. From his confession made in court it appeared that the murder was entirely without

motive, that there was no attempt at concealment, no accomplices, no premeditation, and no repentance for the act, although a voluntary confession of the facts was made. The whole trend of the confession, in brief, shewed that the murder was committed in a fit of insanity.

An examination of the family history of the prisoner, however, threw a very full revelation upon the causes for the murder. His mother had four children, of whom the accused and a younger brother alone survived. After his father's death, she married Fudan Manjhi, a widower with one daughter and one son. The accused took a most intense dislike—even hatred—to this new step-brother. His mother now gave birth to a daughter, who died, as also did her second husband. She now absconded with a third mate, leaving her children at large and entirely uncared for.

The children were taken over by a brother of the second husband, a step-uncle, with the exception of the accused's younger brother, who was taken over by an aunt. The accused took refuge with a third person, Kanah Manjhi, who agreed to feed him in return for his carrying out household duties. Growing up in a casual and uncared for and random way, he drifted finally into the household of one, Raghu Manjhi, and when a youth became enamoured of a girl named Pendo, whom he used to visit stealthily at nights.

He was caught by the parents of the girl one night and compelled to marry her; also to furnish a dowry upon marriage, which he could ill afford.

He now went to live in his father-in-law's house, but soon quarrelled seriously with his relatives-in-law, especially with a young brother-in-law, aged about 12, and even with his wife. Fierce inter-family quarrels led to his being expelled from his house, and a threatened appeal to the police. He now became a wanderer at large.

A few days subsequent to this, he stated that he had a dream. "Mother Kali came to me in the night and told me to kill a man, and then go to Harishbhandrapur, where I will be a king there." The next morning he went out, committed the apparently motiveless murder, and when arrested by the police, explained that he was a king, with the powers to impose punishment.

In brief, the history of the patient's mental life reveals the causes underlying the motiveless murder. In his boyhood we have the intense hatred of his young step-brother, interfering with his affection for his step-sister. Later in life, hating his young brother-in-law and dispossessed of his wife, he was led in the realms of fancy to an imaginary exalted position in which he could be superior to all obstacles. Threatened with being made over to the Harishbhandrapur police, he became in fancy a king of the same place, with authority superior to that of the police. The Kali dream suggested the necessity to prove that authority; whilst his previous hatred of his step-brother and his brother-in-law,—both boys

—indicated that a boy of about that age should be the victim. The murder was, in effect, the satisfaction of a suppressed desire. It is curious that the accused told me that, when he went out armed with a sword to commit murder, the first person whom he met was an adult male, but that he left him alone. On meeting the murdered boy, he thought that the victim had been sent by the villagers as a sacrifice to his overwhelming authority.

The case illustrates the sub-conscious train of thought which led up to the act. That the patient was insane at the time when he committed the murder, I have no doubt at all.

A CASE OF TUBERCULOUS PNEUMONIA.

By V. N. DEUSKAR, L.C.P. & S., I.M.D.,

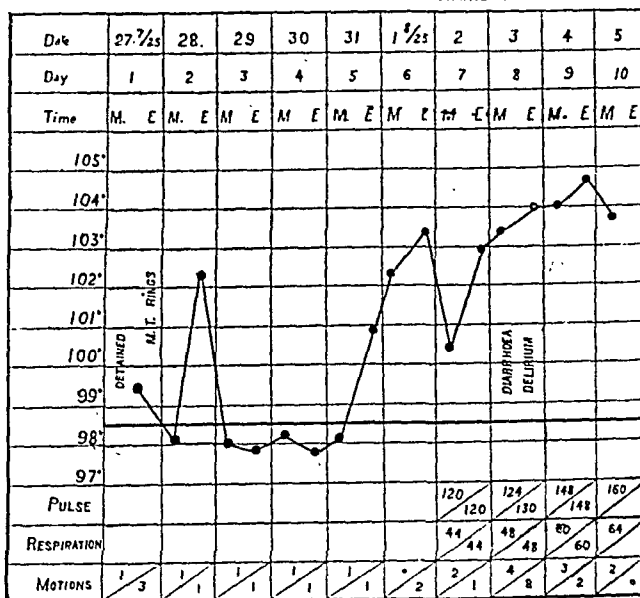
Haddo, Port Blair.

THE temperature chart shewn herewith is that of a strong, well-built Moplah prisoner admitted to Haddo Hospital on the 28th July, 1925, with malignant tertian malaria, subsequently complicated by pneumonia from which he died. The interesting features of the case were:—

- (1) Total absence of cough.
- (2) Total absence of all physical signs in the lungs, which appeared to be absolutely clear till the last.
- (3) Absence of "rusty" sputum and of hæmoptysis.

TEMPERATURE CHART.

NR. 45785. Date of arrival in Port Blair 28th 7th 25. Previous Admissions to Hospital: M.T. Malaria. I. Name: Toran Moideen. Date of Admission 28th 7th 25. B.T. Malaria. I. Age: 33-Years. Result Died 5th 8th 26. DISEASE: Intestinal Tuberculosis I. Pneumonia.



I may add that I have occasionally met with cases of pneumonia where physical signs in the chest were wanting, but never previously with one where cough was also totally absent. The case was definitely diagnosed as one of pneumonia on the seventh day after admission from the

following signs:—(a) flushed face; (b) laboured movements of the alae nasi; (c) quick pulse, and above all (d) hurried and uniformly accentuated respirations. The next day the patient passed twelve diarrhoeic motions in bed and became delirious. Two days later the delirium became worse, and he died at 12-40 noon, gasping for breath.

Post-Mortem Examination.—This shewed atypical pneumonia, probably of tubercular origin.

Findings.

- (1) Both lungs were full of miliary tubercles.
- (2) The pericardial sac contained 4 ozs. of clear serous fluid.
- (3) Both large and small intestine, but especially the large intestine, shewed scattered inflammatory patches of redness but not more than could be accounted for by the diarrhoea which developed on the patient's eighth day in hospital.
- (4) The peritoneum, the mesentery and the mesenteric glands were all normal.

The case is of interest as shewing how severe a pneumonia may develop of tuberculous origin with almost complete absence of all the customary physical signs of pneumonia.

My thanks are due to Dr. A. Bayley de Castro, Junior Medical Officer, Haddo, for his kind permission to publish notes on the case.

large within the previous three months, but he could not state when the goitre and exophthalmos had first appeared.



The case suggests one of Gull's disease,—viz., myxœdema associated with exophthalmic goitre, but there were no signs of generalised myx-



œdema. Gull's disease is stated to occur in adults, more often in women than in men; it

A CASE OF (?) MYXŒDEMA ASSOCIATED WITH EXOPHTHALMIC GOITRE.

By R. M. KAR, M.B., D.T.M. (Bengal),

Assistant Surgeon, Baripada P. O., Mayurbhanj State.

On the 6th January, 1926, an adult male patient came to the Sadar Hospital, Mayurbhanj State, and was admitted to hospital, but absconded the same evening, as he feared that surgical procedures were going to be resorted to. I was able before he left, however, to secure the two rather striking photographs sent herewith of his condition.

He was a well-built village cultivator, some 35 years of age, by caste a Bhuj, a local resident. He stated that no one in his village suffered from a similar complaint. He complained of two diffuse lipomatous-like growths, continuous one with the other by a similar but smaller swelling on the nape of the neck, situated over a bony growth arising from the seventh cervical spine. There was a further small flat lump on the back below the left scapula. The patient was otherwise well-built and shewed no tendency to diffuse subcutaneous deposit of fat elsewhere.

In addition, he had also enlargement of the thyroid gland, exophthalmos, tremor, and a mild degree of tachycardia. There were no signs of cretinism or imbecility and no family history of importance. The fatty swellings had first appeared two years previously, had grown very

may affect several members of the same family, and be hereditarily transmitted through the mother. Exophthalmic goitre may be associated with the myxœdema during the first part of the illness, and the disease is slowly progressive, extending over some 15 years or so. A condition of acute and temporary myxœdema, associated with exophthalmic goitre, has also been described. The rarity of the combination of the diffuse localised swellings with exophthalmic goitre has prompted me to publish these notes upon the case. The condition at least appears to have been either caused by or associated with endocrine deficiency.

(*Note*.—Possibly a case of diffuse lipoma associated with exophthalmic goitre. *Editor, I.M.G.*).

A REMARKABLE CASE OF PSEUDO. HYPERTROPHY.

By HARINANDAN PRASAD, B.Sc., M.B.,
House Physician, Patna General Hospital.

MOHAN, a Hindu male child, aged 8 years, was admitted to the Patna General Hospital on the 14th January, 1926, for the treatment of enlargement of certain muscles, which first started in the thigh about six years previously.

The patient's parents are living and healthy. He has no brother, but a living and healthy sister. There is no family history of such disease either on the paternal or the maternal side.

The patient is ill nourished, anæmic, of 49" in height and 23 seers in weight.

The muscles enlarged are the calves (but fairly strong), the quadriceps extensor, the flexors of the thigh, the glutei, the deltoid, the supra- and infra-spinatus and the erector spinæ.

The muscles atrophied are the pectoralis major, the trapezius and the latissimus dorsi.

The triceps have escaped but are very weak and the recti are separated with bulging in the upper part of the abdomen.

Electrical reaction is present but sluggish, the gait is waddling, lordosis present, loose shoulders are present so far so that the shoulders touched the ears on lifting the patient.

In attempting to assume the erect posture the patient turns over his belly, and proceeds in the usual way described in the books.

Measurements of some of the muscles are:—

Calf—14.2 in. (average normal 7 in.).

Thigh—15.5 in. (average normal 11 in.).

Deltoid 7 in. (average normal 6 in.).

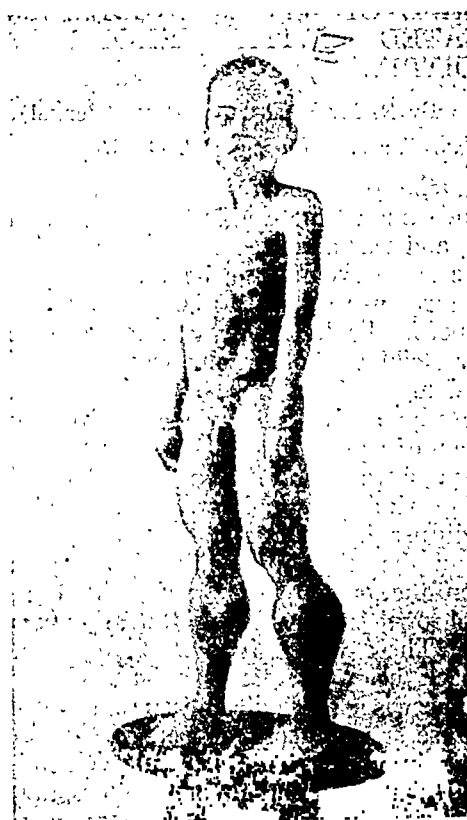
Round the buttock 17 in. (average normal 14 in.).

Girth of abdomen 22 in. (average normal 19 in.).

The two photographs of the patient show the present condition of the different muscles clearly.

I must express my thanks to Colonel H. R. Dutton, I.M.S., the Principal of the Prince of

Wales Medical College and Superintendent of the Hospital and to Professor T. N. Banerjee, the Professor of Pharmacology and Visiting



Physician to the Hospital for their permission to publish in the journal.

Indian Medical Gazette.

APRIL.

THE CHANGING TIMES.

WE think that our readers will agree that Major Knowles and his small band of collaborators have earned the gratitude of the medical profession in India by bringing before them so clear an account of the advances which have been made in Indian medicine during the year 1925. The *Indian Medical Year*, published as a supplement to our issue of last month, is a post-graduate course in itself, and nobody has any excuse for failing to profit by it. In an hour or two at home, on a railway journey or even seated in his motor car the busiest practitioner can make himself familiar with the most important work in India of the previous year.

The younger generation of medical men does not always realise its special advantages and privileges. Even thirty years ago new discoveries of the greatest importance filtered very slowly from their source to the isolated practitioners who were waiting for them.

When Laveran announced the discovery of the malaria parasite, his reports were received with great scepticism by many, and some did not hesitate to call him a charlatan. The reason for this attitude of suspicion was the lack of training in microscopical technique; there were few medical men who were familiar with the appearance of normal blood even in the unstained condition.

When the parasite of kala-azar was detected its reception was very different; within a few months large numbers of medical workers confirmed the discovery, but even at that time there were few who were able or willing to make practical use of the discovery in the diagnosis of the disease, so that for several years kala-azar continued to exist in many places without being detected.

The wheels of progress have speeded up more and more; in the case of tropical medicine the pace has become exceptionally rapid. The number of research workers in tropical diseases has increased to a remarkable degree, there is better publicity for the results of investigations and the medical profession is now much more receptive of new discoveries than it used to be. Compare the slowness of the progress which was made during the ten years which followed the great discovery of Sir Ronald Ross with the rapid march of events in connection with kala-azar. It would almost appear that the work of Ross was a premature birth and that the world was not prepared to receive the great gift which was placed in its hands.

Although our knowledge of kala-azar is far less complete than is that of malaria, yet it is possible to claim that half of the persons who suffered from kala-azar in Assam in 1925 have had a course of treatment. The general public and the public health workers are straining at the leash, they are hardly prepared to wait for final proof of the sandfly transmission view of kala-azar, so eager are they to take action against the accused insect.

For years there have been periodical outbursts of impatience with the reluctance of Government to go full speed ahead with public health measures. Perhaps it may turn out that greater and more solid progress will be made if public health legislation be adopted in response to a demand by the people than if it were launched before the country is educated to a full realization of the necessity for action. The policy of Government appears to have been to create a suitable atmosphere by education and medical relief before taking action which would be likely to arouse opposition if it were forced on an unwilling or hostile community.

Even now the public demand is for medical relief rather than for public health measures and it is with some astonishment that we see highly trained medical men advocating a scheme for enlisting the services of indigenous practitioners with a view to providing medical relief for the whole population of India. Such schemes are more creditable to the hearts than to the heads of proposers and we are of opinion that it will be a black day for India if the forces of medical science are diverted to unscientific channels.

Those who advocate the collaboration of scientific medical men with the followers of the ancient systems claim that there is an insistent demand for the restoration of the old systems and that it is better to yield to this demand in such a way as to get half trained men rather than have to put up with untrained practitioners. It is true that there has been a vocal demand for the teaching of the old systems but we are suspicious of words which have no backing in action, and we find that there is much financial support for schools and colleges which teach scientific medicine, but very little for the Ayurvedic and Tibbi schools.

Also there is no scarcity of educated young men who desire to be trained in the medical schools and colleges and it would be indeed remarkable if it were found better to concentrate on the conversion or reformation of the practitioners of the ancient systems than to give instruction from the beginning on scientific lines to young men who have a good preliminary education.

Some Governments have been attracted by the glib promises of those who claim that efficient healers can be turned out much more cheaply by the followers of the ancient systems than by medical scientists, sad disillusion is bound to result. The next claim will be for equality of

treatment of both types of doctors, this means equality of financial aid, and the result will be that the Governments will have to pay more than before—for the production of chaos. The chief anxiety at the present time is not that medical men are so scarce, it is that there is a danger of their standards of education being too low and that the young practitioners may not be able to earn their bread and butter. It is now a question whether the time has not come for Government to survey the existing position and to decide whether public opinion is not ripe for an advance in public health measures rather than in pure medical relief.

It is also worth while to consider whether it would not be possible to increase the efficiency of the existing organisation of medical relief in such a way as to get twice or thrice the present results in exchange for a small additional expenditure. In many places there are dispensary buildings and trained doctors but the supply of quinine and other essential drugs is far too small. By giving the existing dispensaries adequate supplies of drugs and by insisting on periodical courses of post-graduate study for the doctors it would be easy to obtain vastly better results from the present organisation. This would be a safe and inexpensive experiment, whereas to desert the straight path of science would be exceedingly risky and exceedingly extravagant.

The scheme which is being tried in Madras is full of promise. This consists in giving a small subsidy to qualified practitioners to settle down in villages where no unaided medical man could earn a livelihood. This also is a safe and inexpensive experiment which we commend to the notice of all Governments.

For years we have been claiming that the medical problem of India is so vast and so complicated that a systematic survey of the position is essential. We have held that the problem is not merely one of medical relief and public health; agriculture, economics, social questions and education all form part and parcel of the great question of ill-health and inefficiency: for this reason a broad and comprehensive enquiry should precede the formation of a scheme. The welcome announcement of the intention to appoint a Commission to investigate agriculture arouses hopes that such an enquiry will be instituted, for the Commission will soon find that one of the greatest causes of the poverty of India is disease and malnutrition. We cannot conceive of the success of any policy which does not take into account the prevention of preventable disease. But if Government were to succeed beyond all reasonable expectation in increasing the productivity of the soil and in the prevention of disease, there will still remain the appalling problem of population and food supply; this has tacitly been ignored by all, but it will inevitably come into prominence, unless the people of India are educated to a sense of responsibility in the matter of blind and unrestrained reproduction. It will be a sad state of affairs

if we conquer disease and improve efficiency, only to find ourselves faced with the question of a population which is greatly in excess of the available food supply.

In a former editorial we expressed views on this subject which were regarded by some as being too optimistic. We held that when the people were educated in the prevention of disease and in the improvement of agriculture they would also automatically become capable of dealing with the problem of population, but we freely admit that our optimism was based on the experiences of western countries: there is no experience in the East to guide us in this matter. The only country in the East which has tackled preventable disease in a scientific manner is Japan, there the tendency to later marriages is quite definite, but in spite of this the increase in the population has been such that food shortage threatens to become a grave practical question in the near future.

The problem in India may not become acute within the present generation, but it is abundantly clear that if we interfere with the working of processes by which Nature has kept down the population by disease and war we must attend to the other aspect of the question and avoid allowing the population to grow out of proportion to the available food supply.

Enough has been written to show that it is not enough to control malaria and cholera and tuberculosis and the other great diseases, to do so might be possible. We have to avoid the error of thwarting murderous Nature in one direction, only to leave our flank exposed to a more terrible disaster. The attack by science on unfavourable environment must be wholly scientific, not half scientific. We are face to face with a difficult and dangerous situation: what we need is a well reasoned plan of action, not the impulsive and hasty efforts of impatient though well meaning enthusiasts.

J. W. D. M.

Current Topics.

The General Medical Council and Indian Universities.

(Supplement to the *British Med. Jour.*,
Nov. 28, 1925, p. 187.)
Indian Universities.

THE Executive Committee have received communications from the University of Calcutta indicating that the syndicate are now prepared to receive a visitor or inspector of their M.B. examinations, whose report may enable the Committee to form an opinion concerning the "sufficiency" of that degree in terms of the Medical Acts. Colonel Needham, the official inspector approved by the Council, has accordingly been instructed to visit the examinations in question. His report, however, cannot reach the Committee until, at earliest, its meeting in February, 1926; and no decision as to the renewal of recognition can be reported to the Council before

the May session. Certain interim reports by Colonel Needham on other Indian universities and colleges have been received, and such action as the Committee deemed suitable has been taken thereupon. In particular, his report on the progress made by the University of the Punjab has justified the Committee in continuing for another year the recognition accorded to its degrees, under the same conditions as before.

The Intuitive Capacity of Children to Understand Spoken Language.

IN a very interesting article in the *British Journal of Psychology* (General Section), for July, 1925, Vol. XVI, Part I, Dr. J. W. Tomb, Chief Medical Officer of the Asansol Mines' Board of Health, discusses a subject which is of great interest to all English medical men and to all British mothers in India. Why is it that, whereas British parents in this country are usually only just able—or sometimes unable—to acquire a conversational knowledge of an Indian language, their children can often understand two or three Indian vernaculars simultaneously? The capacity of children to understand spoken language, he concludes, is intuitive and is not a function of intelligence; it is a function of the subconscious mind. Whereas the adult finds the greatest difficulty in learning a new language by the exercise of his reasoning and memorising faculties, the young child of 3 or 4 years of age picks it up intuitively.

Dr. Tomb's article is so interesting that we give it *in extenso* below,—with due acknowledgments to the *British Journal of Psychology*. His appeal for criticism and suggestions will probably not pass unnoticed by our readers. Incidentally, the article possibly throws some light upon better methods of teaching language study. The gramophone is now used frequently for lessons in foreign languages, whilst a recent amusing story in one of the popular magazines dealt with a "Nature" school for the study of languages; the student was led into a room in which was scenically depicted some common episode—a storm, a harvesting scene, or the like; his teacher depicted the moving scene to the student in the foreign language concerned, whilst the actual events happened before the student's eyes; unfortunately the "Nature School" proved financially a failure. The statement is often made that English children, born in India and fluent in an Indian vernacular, pick up that vernacular again with remarkable ease if they return to this country as young adults; but whether there is any real justification for that belief is doubtful. In any case, if Dr. Tomb is right, and if young children pick up a language purely intuitively—as they appear to do—this should profoundly modify methods of teaching such children, and "learning" a language should become a thing of the past in infant schools.

Dr. Tomb writes as follows:—

"No one living in a country such as India, where many different languages are spoken, can fail to be struck with the great facility with which European children pick up the many languages which they hear spoken around them, whilst their parents as a rule speak only one of these languages and that very imperfectly. To put forward a hypothesis to explain this striking state of affairs is the object of the present article.

It is commonly assumed that children learn a language as adults do, by the conscious memorising of parts of speech, moods, tenses, etc., but a moment's reflection will show that this cannot be so in the ordinary case of infants learning their mother-tongue, the parts of speech, moods, tenses, etc., of which cannot be consciously apprehended by them as such, or their use explained to them through the medium of language since they possess none. Moreover, children are universally able to converse freely in their mother-tongue without possessing any appreciation of its grammatical construction, which in civilised countries they afterwards have learnt by tedious years of study at school. Infants, therefore, must possess the capacity of intuitively bestowing the correct meanings on the sounds

(i.e., words) used in their hearing by their nurses, mothers, relatives, and other people.

In the district in Bengal in which the writer resides one frequently sees and hears English babies of from nine months to eighteen months old receiving directions and instructions from their mothers in English, from their *ayahs* in Bengali, from the house-servants in Hindustani, etc., the infants obviously understanding what is being said to them in each and all of these languages long before such infants are able to speak any of these languages themselves. It is also observable that infants appear to comprehend languages in whole sentences which they endeavour to reproduce *in extenso*, but owing to the undeveloped condition of their cerebral cortex and particularly of the speech centre, are unable to do so, merely as a rule producing some simple and easily articulated word belonging to the whole.

It is also a common experience in the district in which the writer lives to hear English children of three or four years old who have been born in the country conversing freely at different times with their parents in English, with their *ayahs* in Bengali, with the garden-coolies in Santali, and with the house-servants in Hindustani, while their parents have learnt with the aid of a *munshi*, and much laborious effort just sufficient Hindustani to comprehend what the house-servants are saying (provided they do not speak too quickly) and to issue simple orders to them connected with domestic affairs. It is even not unusual to see English parents in India unable to understand what their servants are saying to them in Hindustani, and being driven in consequence to bring along an English child of four or five years old, if available, to act as interpreter.

The writer recently became acquainted with a very interesting case of an English girl child aged four who had a Tamil-speaking *ayah* with her for two months only, her permanent *ayah*, a Bengali being ill. Within that period of time and without any apparent effort, the child was able to understand what the *ayah* was saying to her in Tamil and to converse with her in that language. It was moreover observed that the child even continued to speak occasionally in Tamil to the other servants for some time after her Tamil-speaking *ayah* had gone away, apparently not recognising that she was speaking to them in a language which they did not understand. Such a case as this can be satisfactorily explained only on the hypothesis that the child 'intuitively' and subconsciously placed the correct meanings on the various sounds (words) in Tamil which the *ayah* used to her in conversation, and was unaware of any difference between the various languages (English, Bengali, Santali, Hindustani, Tamil), which she was able to speak.

The writer has also observed many instances where English children of three or four years of age have been brought out to India by their parents, who themselves have come to India for the first time; such children after one year have in all instances acquired the capacity both to understand and to speak freely in all the vernaculars of the district they live in, whereas their parents, unless they have employed a teacher and deliberately studied one of the languages, are quite unable at the end of that time to understand what is said in any of them, and are only able to use a few essential and disconnected words, such as those for water, milk, food, chair, table, bed, etc. It is obvious, therefore, that a child's capacity for learning languages is of a subconscious nature and does not depend on 'intelligence,' for if the latter were the case it is reasonable to assume that the parents in such instances would pick up the various vernaculars more quickly than their children, whereas experience shows that the direct opposite occurs. Children must therefore possess the capacity of intuitively placing the correct meaning on spoken sounds, a capacity which they retain up to a certain age, but, in the majority of instances, lose altogether as they approach adult life. On no other hypothesis can the facts related above be intelligibly explained. The writer would welcome criticism of these views by others who, like himself, have had

an opportunity of studying how children in 'foreign' countries pick up the language or languages spoken around them there."

The Epidemiology of Cholera.

A VERY interesting memorandum on this subject is one by Major A. J. H. Russell, M.A., M.D., D.P.H., I.M.S., Director of Public Health, Madras, published as bulletin No. C. H. 339 of the League of Nations' Health Organisation, 1925.

In a historical introduction, Major Russell deals with the known history of cholera epidemics from ancient times until the present day. Cholera was known in India as early as the 14th century and in Europe from the 16th century onwards. In 1780 cholera destroyed some 20,000 persons at the Hardwar festival in India. As early as 1532 it was widespread in Java, India, Arabia and Morocco; in 1756 a vast pandemic occurred which lasted for some 30 years. In 1817 cholera seriously affected the army of Lord Hastings, collected to fight the Pindharis in Bengal, and the record of this outbreak constitutes the first collected account of the ravages of cholera in India. Since 1781 Eastern Bengal has apparently been the chief home and epidemic focus of the disease, whilst Madras has been chronically infected since 1757 or earlier. "Asiatic cholera"—widespread in epidemic after epidemic throughout the world—is undoubtedly of Asiatic origin; but it may be questioned whether there are not endemic foci in India outside Eastern Bengal. Even outside India itself some workers, such as Tholozan (1892) consider that endemic foci exist in Poland and Germany in Europe itself. Hart (1894)—bluntly asserts that the area of the Lower Ganges is the home of cholera for the whole world and that "Mecca is the centre of infection, and the progress of cholera in Egypt and Europe will never be checked until it is cleaned up." Colonel W. G. King, C.I.E., I.M.S. (retd.), also regards Eastern Bengal as the true endemic cholera focus for the whole world. "It is evident, from a review of the literature" writes Major Russell, "that India is considered to be one of the chief sources of infection, but it is not at all certain that Lower Bengal and the valley of the Ganges is the one and only endemic centre which it was commonly supposed to be.....it seems more reasonable to adopt Herbert's view that cholera 'is very generally endemic in some degree throughout the greater part of India.'"

Turning to the question of tracing different pandemics, we have Fayrer's figures for five pandemics from 1817 to 1887, all except one of which were traced to Indian sources. Simpson records nine pandemics between 1823 and 1912, chiefly affecting Persia, Turkey the Crimea, Greece and Morocco. Greig describes seven pandemics between 1826 and 1894 spreading sometimes over world-wide areas.

Modes of spread from India to the West have resulted in the suggestion that certain travelling routes have become crystallised; whereas in the Far East there appear to be not one but several endemic foci, the existence of which cannot be accounted for by importation from Eastern Bengal. Climatic factors are closely associated with cholera incidence and endemicity; whilst seasonal prevalence is a very marked feature of the disease in its epidemic manifestations.

Major Russell concludes his most interesting memoir as follows:—

"1. Cholera has existed in India for many centuries in much the same form as it exists at present.

2. The area of Lower Bengal and the Gangetic valley is not the one and only endemic centre for cholera in India. The disease is very generally endemic in some degree throughout the greater part of the whole peninsula.

3. Other endemic centres are to be found in Central Asia, in the Shat-el-Arab area, in certain parts of the Federated Malay States, in Java and the Dutch East Indies, in Indo-China, in the Philippines, and probably in Southern China.

4. The "latent" infection in the human "carrier," who is always present in endemic areas, only requires

"suitable conditions" in order to produce a fresh outburst of the disease.

5. A series of ten pandemics have been experienced since 1817, but the intervals between these invasions do not reveal any regular periodicity.

6. Mecca plays an all-important part in the spread of cholera through Western Asia, Northern Africa and Europe.

7. In six of the ten pandemics, cholera has followed the land route through Afghanistan or Persia and thence through the Caucasus and Transcaucasia to Russia and Western Europe. In the other instances, the disease has been carried via the Red Sea more or less directly to Egypt and thence to the whole basin of the Mediterranean.

8. The spread of cholera is greatly facilitated by the gathering of travellers at pilgrim centres, fairs and religious festivals.

9. The periodic outbursts of cholera in the countries of the Far East arise from the endemic foci known to exist in that area, and the infection need not necessarily be imported from India.

10. Many writers have attempted to demonstrate a relationship between the incidence of cholera and climatic factors, such as rainfall, humidity, temperature and pressure.

11. In Madras Presidency, the correlation between cholera and rainfall is highly significant, whilst the figures for humidity give either negative or insignificant correlation coefficients with cholera.

12. The seasonal prevalence of cholera is a recognised feature of the disease wherever it has been experienced.

13. The periodicity of cholera epidemics, which has been noted by various workers in different parts of the world, follows a definite 72-month cycle in Madras Presidency over the period 1902-21.

14. Famine or scarcity, with the resulting lowered vitality in the population, produces "suitable conditions" for epidemic outbursts of cholera.

15. Many problems in connection with the epidemiology of cholera still remain unsolved."

Tuberculosis in New York City.

IN contra-distinction to what obtains in India, we may contrast the strenuous efforts which have been put forward during recent years by the New York Tuberculosis and Health Association to rid New York of tuberculosis. Some idea of how very successful these efforts have been may be gathered from the following abstracts from their recent publications:—

"Recent studies of the New York Tuberculosis and Health Association show that striking progress has already been achieved in protecting childhood and saving lives. Secondly, additional knowledge and vantage ground has also been secured from which to attack the still remaining serious condition of tuberculous meningitis in children.

Mr. Drolet, the Statistician of the Research Service of this Association, points out that, whereas twenty-five years ago in New York City, when there were close on a million children under fifteen years of age, 1,370 deaths from tuberculosis occurred, in 1923 only 547 took place, though the child population had increased by almost three-quarters of a million (to 1,679,252)—a reduction in the death rate from 136 per 100,000 to 33, or by 78 per cent.

Mr. Drolet attributes in part the more effective prevention of tuberculosis first to the spread of knowledge about contagion and, secondly, to a number of important health measures which have removed in large part massive infection of children; namely, hospital care of the sick with segregation from their families; systematic disinfection, cleaning and renovation of the former homes of consumptives by the Health Department; examination of food handlers; and, above all, the practically general pasteurization of the milk supply.

Tuberculous meningitis, as Dr. Herben and Dr. Asserson point out, remains the most fatal form of tuberculosis that attacks children. They have collected valuable information concerning the outstanding facts of this serious condition from an intensive investigation made in co-operation with the Health Department of New York City. Institutions and homes were visited, hospital and tenement house records traced, autopsy findings collected and spinal fluids examined.

Dr. Herben and Dr. Asserson report that in tuberculous meningitis a history of contact with cases of active tuberculosis was found in the majority of cases. This form of infection was most prevalent in congested districts and in tenement houses. Most sources of infection were of a human type and only rarely milk-borne. Otitis media, measles, pneumonia and whooping cough in children in contact with active tuberculosis carry a particular menace; the largest mortality from tuberculous meningitis occurred in very young children. Cases among Italians were disproportionately high and springtime seemed the season of greatest mortality. In spinal fluid containing tubercle bacilli, 94 per cent. were of the human type and only 6 per cent. of the bovine.

The seriousness of tuberculous meningitis and the great rarity of recovery from it indicate the extreme importance of preventive measures against tuberculosis.

"More than \$200,000,000 have been invested in tuberculosis sanatoria and hospitals in the United States. There are nearly seven hundred institutions of this type and they make available sixty-six thousand beds for the sick from tuberculosis. Their annual maintenance alone amounts to almost \$75,000,000.

Tuberculosis sanatoria are the original corner stones upon which was built the now highly successful and life-saving movement represented by the organized anti-tuberculosis campaign in America. To what extent are these institutions now utilized, and are more needed or not? This is the definite practical subject to which Mr. Drolet, Statistician of the New York Tuberculosis and Health Association, has applied himself, and in his study of the "Recent Changes in Leading Causes of Death and their Bearing on Tuberculosis Hospitalization" he gives us the broad facts underlying the present tuberculosis and general health situation in this country.

From 1900 down to 1918 in the United States the tuberculosis mortality remained steadily around 150,000 deaths a year; thereafter this great loss was reduced and the deaths now number 100,000 annually. Since 1920 there has been an increase, especially due to after-war building of 30 per cent. in the number of tuberculosis beds in sanatoria, while the mortality was actually decreasing.

Between 1910 and 1922 tuberculosis in the United States passed from being the leading cause of death to fourth rank, being replaced by diseases of the heart. The general tuberculosis situation has been basically altered and, in the communities where there is already available a tuberculosis bed for each tuberculosis death, further enlargement of institutions, or building of new ones, instead of utilizing to fullest capacity existing facilities, is perhaps open to question. On the other hand, Mr Drolet's survey indicates that in only twelve states has this situation been reached, and there is still a deficiency of 39,000 tuberculosis beds in the remainder of the country.

After securing the establishment of tuberculosis institutions, and getting patients to utilize them, the greatest problem has been to retain the sick sufficiently long to achieve a cure or arrest of the disease. Mr. Bell and Mrs. Ilse of the Hospital Service, New York Tuberculosis and Health Association, describe the "Psycho-physiological Effect of Music on Tuberculosis Patients" from their practical knowledge of the value of music as an agency among tuberculosis patients to "dispel morbid thoughts, depressing mental conditions, and.....to bring contentment, renewed interest in life and a willingness to exert the will.....to fight the battle."

The Hospital Service of the New York Tuberculosis and Health Association, under their direction, has been responsible for the arranging during the past year of more than fifteen hundred musical performances, both in auditoriums, and in wards at the bedside of the sick in New York City's tuberculosis institutions, where close on 10,000 patients are reached annually. Mr. Bell and Mrs. Ilse conclude that appropriate music is "a vital and enduring element in tuberculosis treatment."

The Sanocrysin Treatment of Tuberculosis.

In the *Journal of Medical Missions in India* for November, 1925, Dr. C. Frimodt-Møller, Medical Superintendent of the Union Mission Tuberculosis Sanatorium, Madanapalle, gives the results of his experimental testing of this method in Indian subjects.

In 1890 Koch shewed that gold salts have an injurious action on cultures of the tubercle bacillus; subsequently Feldt introduced "Krysolgan," and J. B. White a double chloride of gold and sodium with manganese chloride. Walbum claims that the heavy metals, and especially gold have a stimulating effect on antitoxin production, when given in minute doses. Finally Möllgaard introduced "Sanocrysin,"—a double thiosulphate of sodium and gold. In a dilution of 1 in 100,000 this substance completely inhibits the growth of the tubercle bacillus in culture, although it does not kill the organism *in vitro*. On injection into animals its effects are comparable with those of tuberculin, a marked reaction being produced, with albuminuria and toxic myocarditis. The effects of this shock however can be neutralised by injection of an antitoxic serum containing antibodies. He concludes that "the combined sanocrysin and serum treatment is able to save the life of animals affected by even very grave miliary tuberculosis or tuberculous pneumonia, and to put them into a condition of clinical healing."

The experimental trial of sanocrysin treatment in man was therefore looked forward to very hopefully. In the first series of cases treated doses of from 0.50 to 1.5 grammes of sanocrysin were given intravenously at three-day intervals; a course consisting of 5 to 6 such injections. Severe reactions were observed in the majority of cases, however, and serum administration had to be resorted to whenever there were signs of shock, or when albuminuria resulted. On the whole the results were bad; some deaths occurred; in other patients the tuberculous condition flared up; in others symptoms of metallic poisoning were seen.

The treatment was accordingly modified. The injections are now given at intervals of a week; the doses ranging from 0.1 gramme to 1 gramme or less; and given only at a time when the patient is afebrile. A course consists of 10 to 12 injections and lasts some 3 or 4 months. The specific serum is used only in patients who shew shock or who suffer from albuminuria as the result of the earlier injections; a mild grade of albuminuria during the later injections not being of grave consequence. Further, sanocrysin treatment has often been combined with the induction of artificial pneumothorax. Cases for treatment should be early cases in the "exudative" phase, and should be carefully selected.

Under such controls, results are distinctly promising. Faber in July 1925, reported 42 rather advanced cases treated, with 8 cured and 17 very considerably improved. Begtrup-Hansen reported on 77 cases treated at different stages of the disease, of which 3 were much improved and 32 distinctly improved. Gravesen reported on 45 cases, of which 33 were arrested. Finally Faber sums up his results as follows:—

(1) Sanocrysin has a specific curative action on tuberculosis of the lungs. (2) It does not seem to have the same effect on extrathoracic localised tuberculosis (surgical tuberculosis, meningitis, etc.). (3) It is very effective on fresh tuberculosis of the lungs that has been manifested less than one year. (4) In older cases, the effect of the treatment is uncertain. (5) It is difficult to use it in febrile cases, but some good

results may be obtained in old cases of apyretic fibrous phthisis. So far it has not been able to cure acute lobar tuberculous pneumonia. (6) In ordinary cases a treatment lasts three to four months. (7) Generally the dangers may be avoided when the treatment is carried out in the right manner and with caution. (8) The antitoxic serum has a curative effect on acute shock. Its effect in preventing albuminuria is not clear, and further investigations are necessary."

At Madanapalle 20 patients were placed on the modified treatment, most of them—as is usual in Indian patients—rather advanced cases. Reporting in October 1925, the course of treatment had been completed in 4 of these patients, abandoned in 4 others, and was being continued in the remaining 12. Indian patients are not able to stand the doses given to European patients, and the doses given at Madanapalle have been 0.10 to 0.12 grm. as the initial dose, rising to not more than 0.5 grm. as a maximum. Although mild albuminuria has been seen, no patients have shown shock, or any alarming symptom, although febrile reactions have been frequently noted.

In the group of 4 cases who have completed treatment, the first patient after having been bed-ridden for over a year, can now go for walks, but tubercle bacilli are still present in the sputum; the second responded very well, far better than he had done to pneumothorax treatment, and can now go for walks; a third case was similar to the second; and the fourth is much improved. All four patients still show tubercle bacilli in the sputum however, although in greatly reduced numbers.

In the group of 4 cases where the treatment had to be discontinued, a febrile reaction or fever with albuminuria were the indications which led to treatment being discontinued.

Dr. Frimodt-Møller concludes that the sanocrysin treatment is at least an interesting one; but that the doses given to Indian patients should be far less than those for European patients; that cases must be carefully selected; and that the method calls for close individual attention to each patient to whom it is being administered.

Endocrine Therapy.

British Med. Jour., Dec. 5th, 1925.

At the Section of Medicine of the last annual meeting of the British Medical Association there was a discussion on the uses and abuses of endocrine therapy. Dr. Langdon Brown of St. Bartholomew's Hospital dealt mainly with the uses of endocrine therapy leaving the abuses to be discussed by others.

The ease with which thyroid extract is absorbed from the alimentary tract is probably due to the fact that the secretion of the gland entered this tract originally by the thyro-glossal duct.

The active principle of the thyroid, which is presumably thyroxin, is a general quickener of metabolism—"the draught to the fire"—and is the sole secretion providing iodine to the body. The doses formerly prescribed were too large. A total daily dose of 6 grains of the extract of fresh gland seldom needs to be exceeded, and it is wise to start with not more than $\frac{1}{2}$ grain three times a day. The extract of the desiccated gland is five times as strong as that of the fresh gland. It is worth while in children who fail to grow, who suffer persistently from nocturnal enuresis, who have night terrors, or who suffer from relaxation of the articular ligaments, causing knock-knee, painful heel, flat-foot, or lordosis, to look for stigmata of hypothyroidism, and if they are present to give thyroid extract. Whereas in children the thyroid is the great stimulant to growth, when this is complete its great function is a katabolic agent.

Parathyroid increases the calcium content of the blood, thereby having a sedative effect on nervous tissues, and promoting healing from the effects of chronic sepsis. It is useful in tetany, and sometimes in petit mal. It

is sometimes useful in chronic gastric ulcer, and others have found it useful in sprue and varicose ulcers. It is apparently capable of absorption when administered by the mouth and a rise in the calcium content of the blood follows its use. It is given in doses of one-tenth of a grain once to thrice a day.

The medulla of the adrenals yields an intensively active extract. Adrenalin is a general sympathetic stimulant which can be drawn on in an emergency. In asthma there is a paroxysmal spasm of plain muscle, resulting from vagal overaction. Adrenalin stimulates the antagonistic sympathetic and relieves the spasm. Surely this is not merely a coincidence. There is no satisfactory evidence that adrenalin is absorbed from the alimentary tract; possibly the local vaso-constriction which it excites prevents this. This limits its usefulness for oral administration to oesophageal spasm, gastrostaxis, and the relief of vomiting, in each of which it can act locally on the appropriate sympathetic endings. It can act also as a local vaso-constrictor on mucous membranes such as the conjunctiva and the nose, and appears to be absorbed from the latter. Injected subcutaneously or intravenously it can have a powerful effect in raising the blood pressure, augmenting the heart, relaxing the bronchial muscles, and converting glycogen into sugar. The drug is of little use in substitution therapy for the chronic adrenal lack of Addison's disease. For injection 3 to 5 minims are given for its local effects, by the mouth 10 to 30 minims of the 1 in 1,000 solution.

The anterior lobe of the pituitary gland is concerned with growth, and sexual development, but the active principle has not been isolated. It is usual to administer extracts of the anterior lobe by the mouth for conditions of insufficiency of this portion of the gland, and it certainly appears to have given results. Recent observations by Gardiner Hill show that anterior lobe extracts can promote growth either with or without simultaneous administration of thyroid extract, and that combined administration is more effective than that of either given separately. His results justify our giving the anterior lobe extract by mouth. Two grains thrice daily of the whole gland can be given. Intestinal atony can sometimes be relieved by oral administration of the posterior lobe. Its extracts may be absorbed by spraying into the nose or from plugs of cotton-wool soaked in a solution of the extract and inserted high up into the nasal cavity. This method has met with a fair degree of success in the treatment of diabetes insipidus by pituitrin. Intramuscular injections of $\frac{1}{2}$ to 1 c.c. of pituitrin will stimulate the muscles of the heart, intestine and uterus and will control polyuria.

The efficacy of insulin injections is beyond doubt; but that of any pancreatic extract orally administered is quite uncertain, to say the least. Its value in diabetes is generally admitted in the profession, though unfortunately much prejudice against it has been aroused by the statement that if a patient once starts insulin he must take it for the rest of his life. It is too soon to talk of the cure of diabetes but there have been a considerable number of patients who have had a course of insulin and who are now keeping free from glycosuria and with a normal blood sugar, although they have had no insulin for periods up to a year or more. Persistent hyperglycemia damages the cell islets, so that every case of diabetes must ultimately become pancreatic in character. Our aim should be to restore a normal blood sugar early enough to prevent permanent damage to the islets, and it is therefore important to use insulin as soon as the blood sugar fails to respond to dieting.

Ovarian extract has been shown experimentally to produce definite effects. The best results have hitherto been obtained in cases of ovarian inadequacy in earlier life. Successes have been reported with extract of *corpus luteum*, for the use of which there seems to be some rational basis. The efficacy of any orchitic extract given by the mouth is doubtful. Here the grafting method offers a better chance. There is no rational basis for the administration of thymic extract. Little is to be expected from pineal extract in sexual precocity and muscular dystrophies. Dr. Langdon Brown is entirely

sceptical as to the value of extracts other than those mentioned.

Dr. Swale Vincent on previous occasions has attacked the wholesale uncritical employment of animal products as drugs.

It is only when we are able to institute a true substitution therapy—artificially to replace the internal secretion of some ductless gland—that we have a right to use the expression "endocrine therapy."

It is universally recognized that thyroid gland and its various preparations are effective when given by the mouth. It is also generally admitted that insulin is not of any therapeutic use when orally administered. In regard to all the rest, a score or so of much-puffed preparations, there is very considerable doubt. Preparations of parathyroid, pituitary, and ovary are believed by many to be effective when given by the mouth, while the rest are only prescribed in this manner by the most optimistic and uncritical. It is to be noted, however, that this group includes a very large number of individuals.

Recent reports by responsible writers express considerable doubt as to the value of parathyroid extracts when given by the mouth. According to the statements of numerous writers the preparations given in this way are useful in parathyroid deficiency, nervous disorders, calcium deficiency, chronic toxæmias, etc. Many physicians prescribe small doses of adrenin to be taken by the mouth, though others express doubt as to the efficiency of this proceeding. The pituitary substance, various pancreatic preparations, extracts of ovary, corpus luteum, and mammary gland, are frequently given by the mouth and good results are reported by some observers. Oral administration of orchitic extracts is generally admitted to be useless. Among other organs and tissues, extracts of which are administered by the mouth, we need only mention thymus, pineal body, liver, spleen, kidneys. There is not the slightest reason to believe that these have any action in health or disease, and the same applies to still other substances which are advertised by the manufacturers of endocrine products.

In the case of all endocrine products except one as sold by the manufacturing druggists, there is no satisfactory evidence that any effects whatever are produced in healthy animals when they are given in the ordinary way by the mouth. It would be difficult to mention a drug which is clearly and beyond doubt of value in the treatment of disease and yet which produces no recognizable pharmacodynamical effects upon a healthy animal. In animals or in human beings suffering from insufficiency of secretion of a gland good results might accrue from an extract of the gland in question, while in a normal individual little or no effect might be observed.

It must, however, be remembered that insulin, adrenin, and thyroid extract have a powerful effect upon the normal animal. It will, then, not be unreasonable to regard with considerable suspicion the report that a pharmacologically inactive substance is of therapeutic value.

We do not yet know what is the function, or what are the functions, of the parathyroid glandules.

Most of the recent work has been devoted to the relation of the parathyroids to calcium metabolism. The results of parathyroid medication are still very uncertain. There has been too great a hurry to assume that all kinds of "tetanic" disorders are due to parathyroid lesion or dysfunction. It is by no means certain that any form of tetany is connected with the parathyroids except, indeed, that which sometimes occurs when the glandules are injured or removed during operations upon the thyroid.

In the case of the parathyroid, the ovary, and the pancreas, some special method of extraction is required in order to obtain preparations which display any physiological activity.

Collip has extracted from the parathyroid a principle which, on injection, prevents tetany for thirty hours in parathyroidectomized animals. The substance also produces a very marked increase in the blood calcium.

One of the most interesting items in Collip's communication is the statement that his extract is effective when administered by the mouth. He states most emphatically that he obtained negative results from all the commercial preparations he was able to test.

Parathyroid treatment has recently been recommended for the treatment of sprue. Scott reports excellent results after administration of parathyroid and calcium lactate. The blood calcium increased in accordance with the general improvement of the patients, but there is no statement that the author has tried the effects of calcium lactate without the parathyroid. It is, at any rate, not surprising to find that the administration of a salt of calcium may lead to an increase in the calcium content of the blood.

It is not yet possible to say what is the function of the pituitary body. The structure is composed of several parts, differing in origin, in structure, and presumably in function. Posterior lobe preparations contain principles which will raise the blood pressure and increase the flow of urine and produce other effects when injected into the circulation of an animal. Posterior lobe preparations are useful as drugs (when injected subcutaneously) in the treatment of diabetes insipidus and to aid the contraction of the uterus.

It is generally conceded that adrenal preparations have no effect of any kind in health or disease when they are given by the mouth. A possible exception may be admitted owing to the local action of adrenin on the lining membrane of the stomach. Extracts made from testis and ovary have not been found to produce any effects either in health or disease when given by the mouth.

According to Allen and his co-workers, injections of the extract into animals from which the ovaries have been extirpated produce not only the typical hyperæmia of œstrus, but also hypersecretion in the genital tract and growth of the mammary glands. No positive results were obtained with commercial extracts, nor were there any effects from oral administration.

Insulin ranks with thyroid substance as a means of employing a very valuable substitution therapy. Although the best known and most reliable preparations have to be given by subcutaneous injection, several observers claim that their special substances are effective when given by the mouth.

Dr. H. Gardiner-Hill discussed the value of thyroid extract in obesity and called attention to the way its action could be augmented in certain cases by the simultaneous administration of whole-gland pituitary extract.

By administration of thyroid and whole-gland pituitary extracts simultaneously the beneficial effects of thyroid extract can be obtained without its attendant disadvantages, and a considerable improvement in metabolism and loss of weight occurs. This improvement in metabolism, however, is not maintained for any length of time when treatment is discontinued; sooner or later it reverts to its former state and the patients again gain weight. It does, however, seem possible, when once the weight has been reduced, to maintain the new level of metabolism on decreased doses, and by alternating periods on and off treatment to help these patients considerably.

Desiccated extracts of thyroid and whole-gland pituitary are used and given in doses gradually increased at fortnightly intervals, starting with half a grain of each a day and working up to a point where the patient loses one or two pounds a week. Estimations of the sugar tolerance are made at frequent intervals to control the dosage.

The method of administering thyroid and pituitary extracts simultaneously has also been made use of in certain cases of adolescent goitre. Pituitary extract by itself has no apparent effect on these goitres; if given with thyroid extract the beneficial effect of the latter seems to be enhanced.

Dr. Gardiner-Hill also referred to the value of thyroid and pituitary extracts in the treatment of undergrown children. He cited the case of a girl with juvenile myxœdema, whom he had been treating for the past

three years. Her rate of growth on thyroid extract was more than five times as great as her rate of growth when this treatment was discontinued.

The value of anterior lobe pituitary extract given by the mouth is not generally appreciated. He has several children under treatment with combined thyroid and anterior lobe pituitary extracts, and the resulting increase in growth is greater than in the cases where either of these extracts have been given alone. Estimations of the sugar tolerance again show that in these children also the carbohydrate metabolism is considerably improved by treatment.

Mr. Kenneth M. Walker dealt with the surgical aspect of endocrine therapy—the attempt to remedy deficiencies in the endocrine system by means of grafts.

When donors of a different subspecies or species are employed the absorption of the graft is so rapid that the operation is useless. Indeed, it is probable that in human surgery the use of grafts obtained from such animals as a sheep or a goat is no more effective than the employment of injections of emulsified gland. This being so, if tissue from the lower animals is to be used it is better to follow the technique of Stanley and Kelker and inject fragments of solid gland through a large calibre needle rather than to perform an open operation. Voronoff in his work on testicular grafts, has made extensive use of monkeys, and has justified his choice on the ground that man and the anthropoids are very closely allied in their serum reactions (both agglutination and precipitation). But while it is better to obtain grafts from the higher than from the lower branches of the monkey family, in any case a rapid absorption of such grafts must occur. The only hope of effective work in endocrine transplants lies in the obtaining of material from a human source.

Halstead has stated that grafts do not ordinarily survive unless there is a pre-existing physiological deficiency in the host of the gland in question. For example, transplants of testicle will only succeed in cases of eunuchoidism. Should the animal be fully sexed the grafts will not survive. Still less is a graft capable of surviving when it is exposed to the action of an opposing gland. Thus Steinach found in his masculinization and feminization experiments that it was impossible to engraft an ovary on a male rat or a testis on a female unless the animals had previously been castrated.

In interpreting the results obtained from grafts it is necessary to maintain a strictly critical attitude. Even when an effect has been demonstrated, it must be remembered that the life of the graft, except possibly in the case of an auto-graft, is a limited one, and that sooner or later, and almost certainly within the space of three years, all the transplanted tissue will have disappeared. And what is true of testicular grafts is equally true of transplants of other endocrine glands. Kocher, a pioneer in thyroid grafting, gave it as his belief that it is not possible to obtain permanent relief by such methods. In the cases of glands other than the thyroid and the gonads, the results of transplantation will be found to be still less favourable.

The Treatment of Asthma.

British Med. Jour., Aug. 29, 1925.

In the discussion on the treatment of asthma at the last annual meeting of the British Medical Association, Dr. E. P. Poulton (London), defined asthma as a bronchial spasm and a vaso-motor turbulence and said that there were several causes of this condition. He urged that asthma due to infection, whether from bronchitis or nasal catarrh, or the cardiac asthma of elderly patients (best treated by morphine or oxygen), should be sharply separated from the "allergic" type of asthma due to hypersensitiveness. This group, included, besides asthma, the other well known toxic idiopathies. They must admit with van Leeuwen that skin reactions were of no value in diagnosing the cause of the asthmatic attacks, but his extract of human dandruff might be of great value in determining whether

a case was really allergic, and, besides asthma, it might be used to separate off the allergic cases of epilepsy, migraine, urticaria, and so on, from the remainder of these groups. Asthma was not due to anaphylaxis any more than histamine shock was due to anaphylaxis. The very fact that allergic individuals might be sensitive to drugs, such as aspirin, was also a proof of this. The treatment might be directed to (1) the condition of the patient—specific or non-specific—as described by Dr. Langdon Brown; (2) keeping away from the specific exciting substance by going to Switzerland or other places where it did not occur; (3) to altering the receiving mucous membrane of the nose—for example, by touching certain spots with a cauterizer; (4) altering the condition of the bronchial muscles by subcutaneous injections of 1 to 5 minims of adrenaline to stop spasm, or 1 to 3 minims of caffeine, or by oxygen inhalation. He suggested that the psychic factor had been exaggerated, and was merely subsidiary in causing attacks when the other factors, the exciting substances and so on, were also present. In a similar way an attack of angina or diabetic coma might be precipitated by an emotional disturbance.

Dr. P. Hamill (London) said that it would be borne in mind that sensitivity to bacterial proteins could occur, and probably this was in part, at least, the cause of the asthmatic attacks of elderly chronic bronchitics. It was important in all cases to examine the sputum. Where the dominant infection was the *M. catarrhalis* immunization by means of vaccines was often strikingly successful. In pneumococcal cases the benefit might be considerable, but the immunity was short-lived and courses of inoculation needed to be repeated at intervals. Chronic bacterial infection rendered the patient more susceptible to foreign protein, either by maintaining sensitivity or exhausting the defensive mechanism (exhaustion of the sympathetic and its associated endocrines). Accordingly, attention should be paid to the respiratory tract as a whole, the upper air passages should be carefully examined for evidence of sinus disorders, and any defects or chronic infection dealt with. Dusty occupations should be avoided. Bronchitic infections should be treated specifically, a matter of great importance in avoiding secondary effects and changes in the lungs.

The bronchioles could be relaxed by paralysing the vagal terminations (atropine or hyoscine), by stimulating the sympathetic (adrenaline or cocaine), and by relaxing the plain muscle (amyl nitrite, benzyl benzoate, papaverine). The drugs could be administered by injection (atropine, hyoscine, adrenaline, papaverine, caffeine); by inhalation or spray (atropine, cocaine, adrenaline, nitrites, benzyl esters); asthma powders should be avoided, for the smoke tended to set up bronchitis; and by mouth (atropine, belladonna, etc., benzyl benzoate).

Probably of all remedies the most valuable was a hypodermic of adrenaline 1 to 2 minims, with or without pituitrin at the first onset of distress.

Dr. A. F. Hurst (London) said that during the thirty years he had suffered from asthma he had learnt how to avoid it and how to treat it when it came, but he was still asthmatic. He believed that the authors who from time to time announced that they had discovered a cure for asthma had made this mistake.

The only cure of asthma was not to have it.

An hour's rest before dinner, a complete rest from work each week-end, and at least two holidays of not less than three weeks' duration every year would do much to damp the activity of the asthma centre. The ideal holiday was Switzerland in the winter. An asthmatic, who for weeks had scarcely been able to crawl from one room to another without panting, found himself after a couple of days able to ski, luge, and skate as well as any man of his age. He was, moreover, able to eat anything and to do anything with impunity, as the chemical and reflex causes of his asthma were only operative when his asthma centre was tired and irritable. On returning home he was likely to have three or four months of almost complete freedom before he gradually became fatigued and once more

subject to asthma on exposure to the various exciting causes which operated in his case.

Every asthmatic owed a debt of gratitude to Dr. Brian Melland of Altringham, whose discovery in 1910 that adrenaline could stop an attack was the one great advance in the treatment of asthma since Sir John Floyer wrote his monograph on the subject over two hundred years ago. Dr. Hurst had developed the technique of the adrenaline treatment in his own case and in that of numerous patients who had come under his care, with the result that he believed it was quite unnecessary ever to have a bad night as a result of asthma. It was essential that the injection should be given directly the attack began; during the night it should be given the moment the patient was sufficiently awake to realize that he required it. Adrenaline was the only drug administered subcutaneously which he always advised the patient to give himself, as otherwise it was impossible to inject it sufficiently promptly. If given without delay, the patient was often asleep in less than five minutes from the moment he woke feeling dyspnoic. Used in this way very small doses were sufficient. The speaker never gave himself more than 1 minim of 1 in 1,000 solution of adrenaline chloride, and he had rarely found a patient who required more than 3 minims, although in many instances he had been told by the patient's doctor that 5, 10, or 15 minims were needed or that adrenaline was entirely without effect. This was always due to the fact that it had not been injected until the attack was at its height. Under such conditions 15 minims might produce no other effect than tachycardia, tremor, and a feeling of collapse, whereas, given at the onset, 1 or 2 minims would have completely aborted the attack, without even producing any rise of blood pressure.

"The Treatment of Leprosy: A Suggestion"

IN the *Ceylon Journal of Science*, Section D—Medical, for the 2nd November 1925, Dr. L. Fabian Hirst, M.D. (Lond.), the well known microbiologist to the city of Colombo, puts forward the suggestion that chaulmoogra oils and similar products irradiated—(one presumes by ultra-violet or similar rays)—may be far more potent than the expressed oils themselves, or their ethyl esters. Dr. Muir has recently shewn that fresh cold-drawn oil of *Hydnocarpus wightiana* is the cheapest and best product for subcutaneous injection. May it not be that intense solar radiation in tropical forests may be responsible for this? Olive oil, when irradiated, acquires highly anti-rachitic powers. Fish oils owe their high anti-rachitic power to their high content of vitamins, due to ultimate absorption of such products from the vegetable kingdom. Fats rich in vitamin A are of value in the treatment of tuberculosis. He suggests that "we have only to compare the therapeutic efficiency of *Hydnocarpus* oil in a high energy phase with that of the same substance in a low phase in two parallel series of cases of leprosy..... It may be possible to reactivate degraded anti-leprotic oil by appropriate physical means."

"International Critical Tables."

THE National Academy of Sciences and the National Research Council of the United States is about to publish a monumental work dealing with the above subject. The following is a short account of this forthcoming publication, which will be of interest to all laboratory and biochemical workers:—

"The material contained in International Critical Tables has been collected and critically evaluated by some 300 co-operating experts, including chemists, physicists, and engineers of the United States, Canada, Great Britain, Belgium, France, Italy, Austria, Germany, Denmark, Switzerland, Holland, Australia, and Japan.

The editorial expenses (about \$170,000) have been contributed by American industrial firms and benevolent foundations. The work of the co-operating experts, which is practically gratuitous, may be assigned a money

equivalent of not less than \$300,000. The cost of printing and distribution will be about \$100,000 and the whole undertaking represents a money value of at least \$570,000, of which the returns from subscriptions will represent only a minor part.

The scope of the material collected covers all available information of value concerning the physical properties and numerical characteristics of (a) pure substances; (b) mixtures of definite composition; (c) the important classes of industrial materials; (d) many natural materials and products; and (e) selected data for selected bodies or systems, such as the earth and its main physical sub-divisions and the solar and stellar systems. Publications of the world in all languages have been combed for data and much unpublished information has also been collected.

In addition to their wide scope, the Tables will contain many novel features of arrangement. Thus, for example, not only will it be possible to find readily all of the properties of a given substance or material, but it will also be possible in many cases to ascertain readily what substance or material of a given kind has a maximum, a minimum, or a given value for any given property. This feature will be of great assistance in identifying a substance by means of its properties or in selecting a substance or material on the basis of a given property or combination of properties.

The principal language employed will be English; but much of the explanatory text, the tables of contents, and the very complete index, will be given also in French, German, and Italian.

The work will be issued in five volumes, comprising an estimated 2500 pages (8½ by 11 inches), and the editors are making every effort to compress the material which has been collected into the available 2500 pages. All volumes will be bound in a uniform reinforced buckram binding, and will be delivered to all advance subscribers as issued, with packing and carriage charges prepaid.

1. "International Critical Tables" will be published at the price of \$60 for the five-volume set, at which price all orders placed directly with the publishers will be filled.

2. Until the appearance of Volume One (early in 1926) but not thereafter, the following classes of persons and institutions shall have the right to subscribe at the rate of \$35 for the set of five volumes.

a. Individuals who are members of a recognized scientific or technical society; but only one set may be subscribed for by one individual.

b. Educational institutions, public libraries, government departments, research laboratories, and the libraries of industries. Such organizations may purchase a number of sets if required for their own use.

3. No orders can be accepted from or through book dealers or agents at the pre-publication price."

The Standardisation of Bacterial Vaccines.

IN the *Lancet* for October 31st, 1925, Major H. C. Brown, I.M.S. (retd.), of the Wellcome Bureau of Scientific Research, returns to this subject, which he and Major Kirwan, I.M.S. made particularly their own when they published their method of standardisation by the use of opacity tubes containing suspensions of barium sulphate of different strengths.

In theory, says Major Brown, the ideal way to standardise a bacterial vaccine would be in terms of weight of dried bacterial substance, and in his paper of 1919 he gave such a table, shewing the correlation between weight of dried bacterial substance, number of organisms, and opacity. Lieut.-Col. J. Cunningham, I.M.S. and Sub-Assistant Surgeon B. Timothy, L.M.P. in a paper in the *Indian Journal of Medical Research* (1924), tested the value of Brown and Kirwan's opacity tubes, by an exhaustive piece of work with the hæmocytometer. They found, in common with Brown and Kirwan, that size of the bacteria worked with is of great importance in standardising. Thus for the same opacity, there are 2.9 times as many cholera vibrios,

and three times as many *B. influenza* (Pfeiffer) as there are *B. coli*.

The method introduced by McFarland however ignores this very important point. To sum up, the opacity method used in conjunction with Cunningham and Timothy's exhaustive table of relationship between different opacities and number of organisms of different species—as determined by the hæmocytometer, is the readiest, simplest and most reliable method to utilise. "It is hoped that one man's million will no longer be another man's thousand."

Artificial Sunlight in Dermatology.

IN the *Transactions and Fourteenth Annual Report of the London Dermatological Society*, 1925, p. 17, Dr. F. Howard Humphris gives an interesting analysis of results in the use of ultra-violet radiation in different diseases of the skin. The degree of reaction is taken as the standard for dosage; thus with a first degree erythema, there is no visible exfoliation, and treatment can be given daily; the second degree approximates to mild sunburn; in the third degree the reaction is that of intense sunburn, the epidermis peeling off in strips; in the fourth degree, there is blister formation. The first and second degree treatments aim at a bactericidal effect; that of the third degree at an additional hyperæmic reaction.

Lupus is, of course, the chief disease which has been treated by ultra-violet radiation, but Dr. Humphris claims that there are many other conditions amenable to the same treatment. In acne the method gives clean results with marked improvement, and is free from the danger of burns encountered with x-rays. In alopecia areata results are excellent, and treatment with the Kromayer lamp has almost become the standard treatment for this condition in America; the results as compared to those by previous methods are almost revolutionary. Boils and carbuncles can be aborted by a single exposure so given as to secure a reactionary erythema in the part affected, whilst if pus has formed and has been evacuated, exposure to ultra-violet light will hasten healing and prevent a further crop of boils. In herpes the method greatly relieves pain and lessens subsequent scarring. In impetigo results are good, but only if the local condition has been thoroughly cleansed previously, and all crusts, etc., removed. Lichen planus, which is usually rendered worse by exposure to x-rays, is very amenable to ultra-violet radiation; the intense irritation is at once removed. In three cases of oriental sore complete healing took place, whilst telangiectases can often be cured by the treatment.

In lupus, Dr. Sequeria, after nearly a quarter of a century's experience of the use of ultra-violet radiation states that the "results continue to be of a highly satisfactory character." The dry type of lupus alone is suitable for ultra-violet radiation, and this is fortunate, because it is in precisely this type of lupus that x-rays are absolutely contra-indicated, as their use may lead to the development of carcinoma. In ulcerative lupus, on the other hand, x-rays are invaluable. In addition to local ultra-violet radiation, the whole body should be exposed to the rays of the carbon arc; some 90 per cent. of cures can thus be brought about.

In nævus the cosmetic results are excellent; the treatment is painless and therefore well adapted for babies and young children; there is no scarring, and even scars which are the result of the previous application of caustics may be much improved. Onychia is a disease which is very intractable to different forms of treatment, but very amenable to ultra-violet radiation; in one instance a patient was considering giving up his profession—that of a dentist—on account of this condition, but was cured with five treatments. For chilblains the method should be combined with the use of melted paraffin wax baths. Results are good in the classical type of psoriasis if all pastes and ointments, etc., are carefully cleansed off before exposures are made, and if exposures are combined with general exposures of the whole body to ultra-violet light. Pruritus ani et

vulvæ often clears up completely, but careful preparation of the patients is necessary; all hair must be cut short or shaved and the parts smoothed out with gloved hands in order that the rays may penetrate to all folds and recesses; reaction may be severe, but improvement is marked. In infections with tinea versicolor one or two applications of the Kromayer lamp in contact will usually cure the case. In urticaria in general the radiation relieves the irritation. Chronic ulcers of all kinds, including those associated with varicose veins and following x-ray dermatitis are claimed to respond more quickly to ultra-violet radiation than to any other form of treatment; a weekly exposure sufficient to produce a definite degree of erythema is soon followed by healing.

An interesting discussion followed the reading of Dr. Humphris' paper. Dr. Bunch commented on the work of Rollier at Leysin. General body exposure to artificial sunlight greatly improves bodily metabolism; whilst he prefers to stop short of producing erythema when using the application locally. Dr. Orlebar noted that ultra-violet radiation increases the calcium content of the blood, and suggested that this aspect of the matter should be investigated. Dr. Knyvett Gordon, as a pathologist, asked how the rays act; he was far from certain of their bactericidal action; they do not penetrate the dermis, and possibly their good results are due to the hyperæmia inducing local leucocytosis. Dr. Knowsley Sibley said that the rays were not bactericidal in lupus but probably induced a stimulation of phagocytosis locally. The question of dosage was very important; it must be studied for each individual case. His experience of the method with cases of telangiectasis had been very successful.

Radiographic Diagnosis of Perforated Peptic Ulcer.

Jl. American Med. Assn., Dec. 12th, 1925.

DR. R. T. Vaughan and W. A. Brams of Chicago by the use of the fluoroscope have been able to detect free air in the peritoneal cavity in 86.2 per cent. of series of 29 proved cases of acute perforation of peptic ulcer. No special preparation is needed, the sign may be present as early as two hours after perforation. The air may be seen between the viscera and the abdominal wall or between the diaphragm and the upper surface of the liver.

When a competent radiologist is available this method of examination may be of great service as an addition to the existing means of diagnosis in cases of perforation of the stomach or intestine.

German Medical Ethics.

Lancet, Oct. 24th, 1925.

At the annual meeting of the Deutscher-Aerzte-Vereinsbund, 267 delegates were present, representing medical societies and local branches with a total membership of 33,581. The meeting discussed the suggested codification of medical etiquette.

The proposal contained rules on professional secrecy, on advertising, and on the question of the qualification of specialists. The sale and the purchase of a medical practice is held to be unprofessional except in cases where the widow or the children of a deceased medical man offer his practice for sale. It is further unprofessional to criticise other medical men, to give medical advice, or to practise during a holiday stay in a health resort where other medical men are settled, and to give testimonials for "secret" medicines. The establishment of a joint practice is allowed only between specialists of the same branch or between general practitioners, but not between a specialist and a general practitioner. Canvassing is strictly forbidden and contracts allowed only under special rules.

The reform of the German criminal code was then discussed from a medical point of view. The principal

items of medical interest are that a criminal shall be held responsible for his actions even when in a state of diminished consciousness caused by drunkenness, drunkenness being no longer regarded as an extenuating circumstance. Drunkards shall be subjected to special measures, such as compulsory detention in an asylum, prohibition to obtain intoxicating liquor, loss of civil and voting rights. Other items of interest deal with homosexuality which shall continue to be a criminal offence for men but not for women. Professional secrecy shall not be binding when it conflicts with the public interest as, for instance, in the case of infectious and venereal diseases. Finally the Congress discussed the question of quackery and unqualified practice and voted for its absolute suppression and for an alteration of the law to this end.

Corrigendum.

On page 6 of the *Indian Medical Year*, 1925, issued as a supplement to last month's issue, a paper on Stibosan in private practice is attributed to K. N. Chatterjee. In place of "K. N. Chatterjee" please read S. K. Das: *vide I.M.G.*, Sept. 1925, p. 425. We very much regret the mistake.—EDITOR, *I.M.G.*

Reviews.

THE NEMATODE PARASITES OF VERTEBRATES.—

By Warrington Yorke, M.D., and P. A. Maplestone, M.D., D.S.O., with a foreword by C. W. Stiles, M.D. London: J. & A. Churchill, 1926. Pp. 536, with 307 illustrations. Price, 36s. net.

THE study of parasitic nematodes has proceeded at an extremely rapid rate in recent years, and it has become increasingly difficult for investigators, particularly those who are interested in systematic phases of the subject (and every parasitologist is and must be to a greater or less extent), to keep abreast of the current literature. What constituted single genera fifty years ago, with no more species than one could count on his fingers, may now be split into as many genera as there were formerly species, and the number of described species has increased many fold. As Dr. Stiles points out in his foreword, the present tendency is to seek knowledge for the sake of the good it will do rather than for the sake of knowledge itself, and it is because of this changed viewpoint that nematology has so greatly expanded. Except in a few of the largest library centres of the world, only a fraction of the literature is ever available, and the worker who is far removed from these centres is greatly restricted in his field and hopelessly handicapped in much research which he might otherwise profitably pursue.

Yorke and Maplestone's book is actually a boiled-down library and museum combined, and makes possible an enormous amount of work in the far corners of the world which otherwise could not have been attempted, and it will be the means of saving countless hours of tedious work for every investigator who interests himself in any phase of the study of nematodes which involves determination of genera. The book makes it possible for anyone with a knowledge of nematode morphology to place correctly any species of nematode which he may come upon in its proper genus, if it belong to any genus described up to the middle of 1925.

The book contains clear and carefully worked out keys to all the superfamilies, families, and genera of parasitic nematodes, the best available description of the genera, the name and synonyms of the type species, and a list of such species as can, with a reasonable degree of certainty, be ascribed to each genus. Of inestimable value are the drawings which illustrate the essential characteristics of each genus. In most cases these are drawings of the type species, but in a few instances the authors have been compelled to use other species for this purpose. A very large number of the illustrations are original, since good illustrations were not formerly in existence; the preparation of these must

have involved a very great amount of work. At the end of the book is a list of 684 references which include the literature which the writers have found of most value for their work, and which will likewise be of most value to the users of the book. The references which deal with any particular genus are listed at the conclusion of the section dealing with that genus.

Works of this kind, on account of the enormous amount of work involved, are usually several years old by the time they appear in print, but by what must have been an almost superhuman effort, the present volume is right up to date and includes, not only in its references but also in its text, work which was published not more than a few months prior to the publication of the book.

To sum up, one could do better than quote the last paragraph of Dr Stiles' foreword, addressed to the "unborn helminthologist": "This work of Yorke and Maplestone was written in order to save your time and mine and to make you more efficient in your professional life. It has cost them many hours and days of patient labour. It has not been prepared in order to gain a reputation. It is a labour of love on their part in order to help you. See that you do for the generation which follows you, what Yorke and Maplestone have done for you."

A. C. C.

OPERATIVE CYSTOSCOPY.—By E. Canny Ryall, F.R.C.S., Senior Surgeon to All Saints Hospital. London: Henry Kimpton, 1925. Pp. xv plus 47, with 115 plates containing 670 original illustrations, of which 528 are coloured. Price, 70s. net.

OPERATIVE cystoscopy was until recently one of the secret arts and hidden mysteries practised only by a few adepts. Its technique was surrounded by difficulties, which could be conquered only by years of work and with the help of abundance of clinical material, such as was obtainable only in the great urological clinics. Little could be learnt by watching such operations, the surgeon with his eye glued to the eye-piece of the cystoscope manipulated his instruments slowly and carefully in the depths of the bladder, each step of the operation being usually followed by sharp hæmorrhage, which necessitated prolonged use of the irrigator before work could be resumed. The intervals of clear vision were much too precious to be wasted in demonstrating what was going on to the spectators. Nowadays all this is changed. The majority of the modern intravesical operative procedures are done by means of the diathermy electrode under local anaesthesia. The work is rapid and clean and there is little hæmorrhage at the time, although the separation of the sloughs some days later may be accompanied by sharp secondary hæmorrhage. Still it is the operator alone who sees what is happening whilst the current is passing, the onlooker must be content with brief peeps during pauses in the operation, and, although these operations are now performed at most general hospitals, only those who are on the staff of a special department as surgeons or as clinical assistants can hope to obtain sufficient practice to acquire a real mastery of the technique. For those who have not this advantage, the work under review will be invaluable. There are several good cystoscopic atlases in French and German and some English translations, but we know of nothing like this work. It contains 115 plates, each consisting of 6 cystoscopic views, perfectly executed in colours. The idea is to show the lesion before treatment and then to illustrate the stages of the electrode approaching it, then the appearance of the tumour during and after fulguration, then its appearance some days later and so on to the end of the treatment. One case of cyst at the neck of the bladder is illustrated by no less than 60 cystoscopic views, drawn during a course of treatment which lasted nearly a year and illustrating the whole process from start to finish. The value of such plates to the learner is beyond question, they are the best possible substitute for the actual personal experience which can be obtained by only a favoured few.

The plates occupy the major portion of the volume, the descriptions of each picture being given in English, French and German, whilst the descriptive letterpress is restricted to some 40 pages, in which the author's methods are briefly described. The opening chapter describes his excellent method of local anaesthesia, cocaine in 0.5 per cent. solution being the agent employed. The next section deals with removal of impacted calculi from the lower end of the ureter, for which difficult operation the author has invented several ingenious instruments. The removal of vesical calculi by means of his own improved cystoscopic lithotrite, which obviates the danger of leaving small fragments behind, is next described followed by a few notes on the removal of foreign bodies from the bladder. The treatment of bladder growths by diathermy is profusely illustrated and it is obvious that the author must have had immense clinical experience. The final sections deal with the treatment of certain types of prostatic obstruction by diathermy and the treatment by intravesical methods of obstruction at the neck of the bladder following prostatectomy, a condition for which a secondary open operation is usually performed. This is controversial ground, but similar methods are now being used in cases of obstruction by fibrous small prostates by a few of the advanced school and there is nothing unsound in its application to post-operative stenosis at the internal meatus, a condition more common than is usually supposed.

We have nothing but praise for this work, which should be of the greatest use to those specialising in this branch of surgery. The author is to be congratulated on his contribution to genito-urinary surgery and and so too is Mr. Thornton Shiells, the artist responsible for the beautiful coloured plates, which are such a unique feature of the work. The price is high, but not unduly so when the immense expense of the production of such a book is considered.

W. L. H.

FRACTURES AND DISLOCATIONS.—By Philip D. Wilson, A.B., M.D., F.A.C.S., and William A. Cochrane, M.B., Ch.B., F.R.C.S. (Edin.). London: J. B. Lippincott, Co. Pp. 789, with 978 illustrations. Price, 45s. net. Obtainable in India from Messrs. Butterworth & Co. (India), Ltd., Calcutta. Price, Rs. 33-12.

A GREAT surgical teacher used to say that a 'dark ooze of base ingratitude' comes out when a bone breaks. Certain it is that the public have very erroneous ideas about fractures. A bone breaks, it is set with a 'click' by the really clever surgeon and healing follows, with the result that the bone is stronger than it was before!

With such views to combat it is obvious that the surgical profession have a public educative duty to perform as well as a duty to their patients.

Good books on fractures and dislocations are rare and the teaching in this branch of surgery in many hospitals is meagre and unpractical, so we more than welcome this excellent volume. The public too, who are beginning to do some medical reading, may learn something from it and be more tolerant of the results obtained in difficult cases.

Perhaps the treatment of fractures by open operation is not sufficiently stressed, but this is better than undue emphasis on methods of plating and wiring, etc. Unskilled surgeons, who after all are very much in the majority, produce woeful results by injudicious selection and imperfect technique. Every case of fracture cannot be treated by orthopaedic experts and it is therefore essential that non-operative methods must be thoroughly taught and in our opinion very good results can be obtained by them.

The treatment of supra-condyloid fractures of the humerus by careful reduction, followed by fixation in full flexion, is favoured in this book. We are quite satisfied that good results can be obtained by this method. Too much impatience is shown by some surgeons in expecting good results in these cases in a

short space of time. Nature, with infinite patience, by moulding and bending can make perfect results which have appeared most dubious. This particularly applies to children, who are most liable to this injury.

'Fractures and Dislocations' is a book which admirably illustrates what can be done by co-operation and team work. A fracture unit would be an asset to every hospital, beneficial to the administration, to the patients and the students.

CLINICAL RESEARCHES IN ACUTE ABDOMINAL DISEASE.—By Zachary Cope, B.A., M.D., M.S. (Lond.), F.R.C.S. (Eng.). London: Humphrey Milford, Oxford University Press. Pp. 148. Price, 12s. 6d. net.

THIS book is a record of clinical researches in acute abdominal diseases, and is both extremely interesting and instructive. It should be in the hands of every surgeon who may be called upon to deal with the "acute abdomen." The chapters on "study of phrenic shoulder-pain" and "subacute perinephric abscess" are of special value. We cordially recommend the book to surgeons in particular.

A SURGICAL CLINICAL HANDBOOK.—By N. S. Narasimham, L.M.P. (Madras), L.C.P.S. (Bombay). Madras: P. Rungachariar & Co., 1925. Pp. 192.

THE purpose of this little book is not obvious. Its value—even as a "cram" book for students is of the slightest; whilst—from the teaching point of view—there is nothing in it which the student will not find in any standard text-book on surgery far better expressed and more helpfully arranged.

INDIAN HYGIENE AND PUBLIC HEALTH.—By C. L. Dunn, D.P.H. (Lond.), Lieut.-Col., I.M.S., and D. D. Pandya, D.P.H. (Camb.), Rai Bahadur. Calcutta: Butterworth & Co. (India), Ltd., 1925. Pp. 679 plus xiv, with 83 illustrations. Price, Rs. 12 net.

THE publishers cannot be congratulated on the get-up of this volume. It is thick and narrow: an awkward shape to hold and severe on binding. The diagrams and illustrations are mostly crude and some of them are really bad.

The illustration of a *Stegomyia* mosquito is a mere smudge, while that of the larvæ of *Culex* and *Anopheles* on page 186 is upside down.

The majority of the work is excellently written in clear and lucid English but with so many good text-books on entomology and protozoology in existence Chapter X might well be modified.

With regard to the Sanitary Law chapter the authors would have done better to write a summary of the Acts after the manner of Robertson and Porter's well known text-book, rather than load the volume with the full text.

There are one or two errors and omissions which the authors should correct in future editions. There is no mention of the work of Leonard Hill and the katar thermometer, and a description of a modern steam disinfectant is wanted. A two-foot head on a newly scraped slow sand filter would give much more than the proper rate of filtration. A two-inch head is possibly meant. In the activated sludge process ripened sludge is mixed with incoming raw sewage, a fact not mentioned here. All the way through borrow pits are called burrow pits.

The book has some excellent standard plans and is bound to be highly popular with health officers in India.

A. B. F.

ALCOHOL IN MEDICAL PRACTICE.—By C. C. Weeks, M.R.C.S., L.R.C.P. London: H. K. Lewis & Co., Ltd., 1925. Pp. x plus 186. Price, 3s. 6d. net.

IN the first chapter the author compares the expenditure on wines and liquors in hospitals in Great Britain and shows that there has been a remarkable decrease in their use during recent years. This the author thinks is mainly due to the increasing disposition of medical practitioners to decrease the use of alcohol in

disease. A large amount of statistical evidence is collected which is to be found in the appendices. In the chapters which follow the author shows that alcohol is not a stimulant, but acts rather as a depressant and narcotic and it impairs resistance to disease. It has a direct toxic action on the myocardium and accentuates cardiac failure rather than counteracts this condition. He deprecates its use in pneumonia, in diseases of children, gastric disorders and surgical conditions. The author is of opinion that the abuse of alcohol has had a disastrous effect on society, and the medical profession should stop its use both on moral and scientific grounds. The chapter on the evolution of medical opinion is interesting and the book is well worth perusal.

WHAT TO DO IN CASES OF POISONING.—By William Murrell, M.D., F.R.C.P. 13th Edition. Revised by P. Hamill, M.D., D.Sc., F.R.C.P. London: H. K. Lewis & Co., Ltd., 1925. Pp. vi plus 276. Price, 4s. 6d. net.

THAT Dr. Murrell's book is well known and popular among medical students and practitioners is evident from the number of editions it has gone through. The thirteenth edition has been thoroughly revised, many new poisons have been added and the subject matter been brought up to date. This little volume is very handy and useful and should be in the possession of every practising physician and senior student.

THE CHEMICAL AND PHYSIOLOGICAL PROPERTIES OF THE INTERNAL SECRETIONS.—By E. C. Dodds, Ph.D., B.Sc., M.B., B.S. and F. Dickens, M.A., Ph.D. London: Humphrey Milford, Oxford University Press. Pp. 214. Price, 8s. 6d.

THE author says in the preface that this book has no claim to originality and is merely a summary of the literature dealing with the chemical aspects of the internal secretions. Nevertheless the book is of great practical utility to those interested in the preparation and standardisation of gland products. The literature on this subject is very vast and scattered and the authors have taken a great deal of trouble in sifting it and presenting to the reader the best methods of isolation and preparation of endocrine substances.

The bibliography at the end of each chapter gives most of the important references and is a useful feature of this book. A summary of the physiological action of the active principles of glands and references to their therapeutic uses enhances the value of this book.

A MANUAL OF CHEMISTRY. VOL. II.—ORGANIC CHEMISTRY.—By A. P. Luff, C.B.E., M.D., B.Sc. (Lond.), F.R.C.P., and H. C. H. Candy, B.A., B.Sc. (Lond.), F.I.C. 7th Edition. London: Cassell & Co., Ltd., 1926. Pp. 268, with 12 illustrations. Price, 6s. net.

A book that has reached its seventh edition within a comparatively short period needs no comment on its merits. It is a worthy successor to its predecessor and will no doubt be useful and popular with those for whom it is intended. There are many valuable additions and a few judicious eliminations which have kept the size of the book very nearly unaltered. By the elimination of such subjects as the method of determination of vapour density the usefulness of this edition has suffered in no way; on the other hand, numerous additions have helped to bring the volume up to date.

The hydrocarbons, alcohols, carbohydrates, glucosides, aldehydes, ketones, organic acids, amino acids, the aromatic compounds, the alkaloids and several other substances of medical interest have been dealt with in a manner specially suited to the needs of medical students. The practical portion of the book not only deals with the preparation of acids and bases and esters but also dwells on the identification of specified organic substances like alcohol, aldehydes, acetone, phenol, acetoacetic acid, cholesterol, alkaloids, etc. Quantitative estimation methods for nitrogen, urea, uric acid, glucose, etc., and the method of finding out the saponification

number and iodine number of fats and oils have also been given in a concise but masterly manner.

The medical student will be pleased with a book which tells him clearly and concisely all he needs to know in order to satisfy his examiner and this book gives all that a medical student is likely to be asked about in organic chemistry.

MUSCULAR ACTIVITY.—By Archibald Vivian Hill, M.A., Sc.D., F.R.S. Baltimore: Williams and Wilkins Co., 1926. Pp. 115. Price, \$2.75.

THIS book consists of four Hertter Memorial Lectures delivered by the author in 1924. The subject matter comprises a series of discussions summarising the most recent researches on the nature of muscular function. The first lecture deals with the dynamics of muscular activity; after discussing various phenomena concerned with stimulation, stretching, viscosity, etc., of muscle, the author says that the cross striations of a muscle are probably there to divide the fibres into water-tight compartments to prevent irreversible segmentation of its contents. The second lecture deals with heat production in muscle. When a muscle is stretched its temperature rises, when it is released the temperature falls. Both these are followed by an irreversible process in which mechanical energy is degraded into heat, owing to the viscosity of the muscle substance. The third lecture deals with the chemical changes in muscular activity and after discussing various processes connected with the formation of lactic acid and its neutralisation, the author says "to pry into the chemical nature of actual process of life is very attractive—but very hard. It is so difficult to get inside the living cell without destroying its structure and stopping its machinery." We have therefore little knowledge of what is actually going on inside a cell and can only speculate. The last lecture deals with the recovery processes after muscular exercise in man and is very instructive.

The book is interesting reading and is well worth perusal.

Annual Reports.

ANNUAL REPORT OF THE DIRECTOR OF PUBLIC HEALTH, UNITED PROVINCES OF AGRA AND OUDH, FOR THE YEAR 1924. BY LIEUT.-COL. C. L. DUNN, D.P.H., I.M.S., DIRECTOR OF PUBLIC HEALTH, U. P. ALLAHABAD: SUPDT., GOVT. PRINTING, U. P., 1925. PRICE, RS. 3.

THE question of the introduction of better registration of vital occurrences has been under the consideration of the local government during the year, and a new set of model bye-laws drawn up by the Director of Public Health was circulated. In town areas the duty of reporting such occurrences has now been transferred from the police to the urban authorities. The provincial birth rate for the year was 34.72 as against 36.04 for the previous quinquennium; and the death rate 28.29 as against a corresponding figure of 33.37. As compared with 1923 however the death rate showed an increase under all headings except plague and injuries.

As usual more males were born than females, 112.47 to 100. Municipal areas showed a slightly greater excess of birth over death rates than did rural areas. The highest monthly death rate is recorded in April, 2.78, and the lowest in February, 1.76. The infantile mortality for the year is estimated at 192 per mille, fevers, tetanus and convulsions being the chief contributory causes. Cawnpore returned the enormous infantile death rate of 476.9 per mille, whilst Etawah was a good (? bad) second with a rate of 399.9. The infantile mortality rate was 270.7 in the urban areas as compared with 184.5 in the rural areas. The highest

infantile mortality occurs in October, and the lowest in March.

Of the most important contributory causes to the general mortality, fevers come first with a death rate of 20.9 per mille; cholera second, 1.48; and plague third, 1.24. The total cholera mortality was 67,000 deaths as against 2,591 in the previous year; the districts chiefly affected being Azimgarh, Banda, Jaunpur, Gorakhpur and Sultanpur. The disease was introduced from the adjacent provinces of Bengal and Bihar. In addition to the provision of special allotments to district boards and local bodies, some 12 tons of potassium permanganate were supplied. The special cholera schemes in Almora and on the pilgrim route in Garhwal district were attended with success.

Small-pox shewed 7,224 deaths as against 747 in the previous year, and June shewed the highest incidence of this disease. "Fevers" accounted for 947,807 deaths—or nearly one million. In urban areas the fever mortality was 17.48 as against a figure of 21.13 in rural areas. Malaria, enteric fever, relapsing fever, and—to a very slight extent—kala-azar were responsible, but it is difficult to verify the diagnoses. It is interesting to note that, despite the fact that kala-azar is not to any marked extent a prevalent disease in the U. P. the local government has nevertheless contributed its quota towards the expenses of the Indian Kala-Azar Commission.

Dysentery and diarrhoea accounted for 11,989 deaths, the highest mortality from these causes being in September and the lowest in February. Garhwal for some obscure reason shews a very high incidence, a death rate of 4.18 from these diseases per mille. Respiratory diseases accounted for 27,412 deaths, or a mortality of 0.6 per mille. November is the highest month of incidence and July the lowest.

An interesting table on p. 12 of the report gives the percentages of total deaths from different causes submitted (a) by expert agency, and (b) by unverified, ordinary agency. The differences are very striking; the figures for malaria being 2.1 and 64.2 respectively; for pneumonia 9.4 and 0.4 respectively; for plague 1.2 and 4.4 respectively.

The Assistant Directors of Public Health in the province were Major W. A. Mearns, M.B., D.P.H., I.M.S.; Captain D. Clyde, M.B., D.P.H., I.M.S.; Dr. A. Sousa, D.P.H.; and Dr. K. P. Mathur. Major J. A. S. Phillips, D.P.H., I.M.S., was Assistant Director of Public Health (Malariology). A special class for fifteen medical officers was held in malariology at Banbassa. As in previous years the work at Banbassa (the headquarters of the great Sarda Canal construction) was arduous and exceedingly successful. Since the malarial branch in the province commenced work at Banbassa the annual period during which work is carried on has been lengthened by two months as the result of anti-malarial measures. The monsoon in 1924 was late and was a heavy one, and extensive jungle clearing had in consequence to be undertaken. This was followed by an extension of the drainage and new swamps not previously dealt with were attended to. During the working season quinine prophylaxis was systematically carried out and the results appear to have been very good. A branch dispensary was opened in the main labour camp. At Saharanpur the results of previous measures have been exceedingly successful in reducing the malaria rate, but Major Phillips reports that reopening of the small irrigation canals and their neglect threatens to undo all the good accomplished. A total of Rs. 14,202 worth of quinine was sold through the different agencies, as against a corresponding amount of Rs. 7,784 in the previous year.

The total number of deaths from plague in the British districts was 56,210 as against 74,187 for the previous year. Meerut, Bulandshahr, Azimgarh, Ghazipur and Muttra were the districts most heavily infected. A total number of 45,430 persons were inoculated with anti-plague vaccine during the year. When properly organised and supervised, evacuation of the infected dwellings

is a most useful measure. There were 36 travelling dispensaries at work during the year, and they have been so successful that they have now been made a permanent institution in the public health policy of the province. In addition, further provision was made for maintaining at district headquarters demobilised travelling dispensaries, with equipment, etc., all held in reserve, which can be mobilised on the appearance of any epidemic.

The Publicity Bureau was in charge of Dr. Khalil-ul Rahman, and a large volume of propaganda work was carried out. There are now 38 complete sets of lantern equipment, 10 sets of posters and booklets, and 38 sets of lantern slides. It is a pity that the contribution from local bodies towards this work is so little, amounting in 1924 to only Rs. 5,400. The district health scheme was extended to the districts of Fyzabad and Gonda, and is now in force in all five districts. The chief duties of the officers appointed under these schemes is the control of epidemic plague and cholera, supervision of vaccination, hygiene propaganda, routine inspection of villages and schools, and verification of vital statistics. Each district scheme includes a district medical officer of health, an assistant medical officer of health, a sanitary inspector, a travelling dispensary with personnel and equipment, and vaccination staff. The organisation is as yet only a skeleton one; but it provides a nucleus for expansion when severe epidemics set in; and a permanent health staff for general control of rural public health and has proved of great utility.

Turning to more general matters, 3 out of 10 municipal boards which had not appointed municipal medical officers of health, as a result of official pressure, were induced to appoint such officers during the year. Where such officers are installed they prove so useful that it has proved very difficult to secure their absence for even so short a time as to attend the classes in malariology at Banbassa. The conditions of service of these officers, however, need improvement. The provisions of the Food Adulteration Act were extended, and much work done in the Public Analyst's department. Eighty-eight persons were prosecuted under this Act during the year, of whom 67 were fined, the total fines amounting to Rs. 1,153. Child welfare and maternity propaganda are being steadily pushed throughout the province; at Allahabad there are two centres, and 1,194 labour cases were attended, and 11,505 visits to homes paid. At Bareilly 1,327 labour cases were attended by the staff of Mrs. Stubbs' Maternity and Child Welfare Society. At Gonda a maternity ward has been built at Nawabganj, and at Dehra Dun a new centre has been opened; whilst other centres in the province continued to do good work during the year. Hitherto the policy with regard to the training of *dhais* has been to train as many as possible; it is now felt that efforts should be made to secure a better class of *dhai* for training, and a two years' course of training, either at a hospital or at a centre for maternity and child welfare is suggested. In all 46 probationer midwives were in training during the year under the All-India Lady Chelmsford's League, of whom 11 passed out.

Grants totalling Rs. 7,21,945 were sanctioned by the Board of Public Health during the year. Colonel Dunn draws attention to the fact that—apart from provision for vaccination,—there are very few district boards which spend any appreciable sum of money on hygiene and sanitation. On the one hand large grants are made by the provincial governments; on the other hand, the *ma bap* policy is adopted, in the hope that Heaven will provide, or that epidemics may not arise. "I am strongly of opinion that, while it is the duty of Government to assist local bodies by supplying superior expert personnel to organise and control public health measures in districts, it is undoubtedly the duty of local bodies to furnish funds for inferior personnel, hygienic measures and sanitary improvements. The percentage of the total income of the district boards devoted to these purposes is infinitesimal, whereas in municipal boards a large proportion of the municipal income is

spent on the improvement of public health. . . . The district boards have at present no organisation for expending such grants. This organisation, however, is gradually being provided by the extension of the district health scheme."

The many fairs and festival gatherings in the province passed off successfully during the year without the outbreak of epidemic disease, and advantage was taken of these fairs to give lantern lectures and carry out hygiene propaganda. During September and October extensive floods occurred in certain parts of the province and the Public Health Department took its share in the relief measures; travelling dispensaries were specially mobilised and quinine to the value of Rs. 7,000 distributed, whilst advantage was taken of the destruction of villages to advise reconstruction on approved sanitary lines.

Colonel Dunn's report is perhaps chiefly of interest in connection with the introduction of the public health scheme for districts. The report also includes the annual report of the Superintending Engineer, Public Health Department, U. P. for the year,—Mr. G. McC. Hoey, M.Inst.C.E.

ANNUAL STATEMENTS OF THE DISPENSARIES AND CHARITABLE INSTITUTIONS OF THE PUNJAB FOR THE YEAR 1924. By LIEUT.-COL. G. TATE, OFFG. I.G.C.H., PUNJAB, LAHORE: SUPDT., PUNJAB GOVT. PRESS, 1925. PRICE, RS. 3.

THE year opened with 626 hospitals and dispensaries of all classes, and closed with 640. The number of local fund institutions continues to increase steadily and has risen from 312 in 1920 to 371 in 1924. There were 31 travelling dispensaries in operation at the close of the year, and Colonel Tate speaks well of their activities. The official ideal of one dispensary for every 100 square miles of country has yet not come within sight however; excluding special female police, canal, etc., dispensaries there is on an average one general dispensary to every 287 square miles, with an average population of 62,643. The local bodies appear to have reached the end of their resources, and further expansion can only be expected if funds are provided by the provincial government. The matter however is under the consideration of the Punjab Government and it was hoped in 1925 to start 70 new dispensaries, these dispensaries to be in charge of sub-assistant surgeons recruited by district boards on a five-year contract basis.

The total number of patients treated during the year was 5,935,079 and included in-patients numbering 109,503,—figures which almost stagger the imagination, but which shew at least that medical relief is a reality in India. We have heard so much lately about the Indian masses who are never reached by present-day modern medicine that it is just as well that the other side of the picture should be presented. An average number of 5,532 beds was occupied by an average daily number of 3,931 patients. An increase of some 300,000 in the out-patient attendance for the province is ascribed to epidemic malaria in certain parts of the Punjab during the year. Cholera and small-pox also shewed a definite increase during the year. No less than 1,372,675 persons suffering from eye troubles were treated. Surgical operations numbered 292,026 during the year; cataract operations numbering 18,778 and litholapaxies 1,317. At Moga the work of Rai Bahadur Dr. Mathra Das is not merely provincial, but attracts patients from all over India.

The total income for this enormous provision of medical relief throughout the province was Rs. 43,43,450. It is gratifying to note that there has been a substantial increase in the subscriptions from Indians, a total of Rs. 1,46,735 as against Rs. 51,947 in the previous year being recorded. Several instances are quoted of considerable sums being collected for specified purposes by different doctors and other public spirited individuals of the community. Expenditure during the year amount-

ed to Rs. 42,06,627. At the Maternity Hospital, Lahore, the experiment was tried of allowing students to attend and conduct labour cases; to some extent the patients concerned left hospital in consequence, but, on the whole the experiment was successful. It is the first time that such an experiment has been tried in the Punjab.

The most notable feature of the year was the opening at Simla of the Lady Reading Hospital for Women and Children. A separate female hospital has also been provided at Dera Ghazi Khan. The work of the Punjab Medical School for Women at Ludhiana has steadily increased, and there were 33 new students enrolled during the year, of the female sub-assistant surgeon class. The supply of female dispensers is still inadequate, but it is hoped that the lowering of the standard of academic qualifications required—previously almost the same as for entrants to the sub-assistant surgeon class—will improve the supply. The number of trained *dhais* in the province was held to be insufficient to warrant the introduction of their compulsory registration.

The post of Lady Assistant to the I.G.C.H., Punjab was abolished early in 1925, Dr. D. F. Curjel Wilson having retired. Special provision was made at the King Edward Medical College, Lahore, for research work into Indian indigenous drugs. Measures were taken to prevent patients attending hospital being victimised by the subordinate hospital establishment, and notices forbidding the taking of gratuities by such establishment were posted in prominent places in hospitals and dispensaries.

Colonel (now Major-General) R. Heard, C.I.E., K.H.S., I.M.S., was in charge for the first three months of the year; Lieut.-Col. E. L. Ward, C.B.E., I.M.S. subsequently; and Colonel C. R. Bakhle, I.M.S. with effect from the 4th June 1924.

The "Annual Statement" together with its annexed tables may appear to be a somewhat uninteresting document. In reality it represents an enormous field of active medical and surgical work, and shows how much is already being done for the rural population of India, under government and official aegis.

ANNUAL REPORT ON THE CIVIL HOSPITALS AND DISPENSARIES, MADRAS PRESIDENCY FOR THE YEAR 1924. BY MAJOR-GENERAL T. H. SYMONS, C.S.I., O.B.E., K.H.S., I.M.S., SURGEON-GENERAL WITH THE GOVERNMENT OF MADRAS. MADRAS: SUPDT., GOVT. PRINTING, 1925. PRICE, RS. 2-6-0.

THE number of medical institutions in the province was 766, in addition to which several local bodies are being subsidised by government under the scheme for extending medical aid in rural areas; 58 rural dispensaries have been sanctioned in *taluk* board areas and many more are likely to be opened. In-patients during the year numbered 145,651, and out-patients 8,502,474; the death rate among in-patients was 4.83. The chief diseases among in-patients were in order of frequency malaria, disorders of the digestive system, of the skin, and of the respiratory system; among out-patients eye diseases were a conspicuous feature of the work. Of the total number of in-patients and out-patients treated, 6,580,930 were Hindus, 1,029,945 Mahomedans, and 53,048 Europeans and Anglo-Indians. Operative work during the year shewed an increase notably in aural, mastoid and eye operations. Financially the total income during the year was Rs. 56,94,216, of which the provincial government contribution was Rs. 31,13,529.

A total of 27,291 persons were examined for hook-worm infection, and 64 per cent. were found to be infected; 123,095 treatments were given, thymol, cheno-podium and carbon tetrachloride being the drugs chiefly used. Small-pox cases treated numbered 1,111 with only 90 deaths—a very satisfactory figure. Of labour cases 49,115 were attended by 493 midwives. The system of appointing suitable private practitioners as honorary

physicians and surgeons to the Presidency State hospitals in Madras is reported to be working smoothly. The year was especially noteworthy in the *extension of medical relief in rural areas by subsidising private medical practitioners*. "This has not only solved the problem of bringing medical relief of the best kind within easy reach of the rural population," writes General Symons, "but it has also solved the problem of unemployment of medical practitioners. By this system these practitioners are granted subsidies or honoraria and provided with medicines also if they agree to settle down in specified villages. An additional subsidy is given to such of the medical men as engage and maintain a qualified midwife. Fifty-eight such dispensaries were sanctioned for opening during 1924." The scheme is a very interesting one as it represents a real attempt to solve this paramount Indian medical problem.

A special retrenchment officer was appointed by government during the year to inspect the Presidency State hospitals in Madras city and some headquarter hospitals; and, as a result of his recommendations, certain appointments have been abolished and the maximum cost of diets fixed.

The district medical libraries had 695 members on their lists during the year.

ANNUAL RETURNS OF THE HOSPITALS AND DISPENSARIES IN BIHAR AND ORISSA FOR THE YEAR 1924. BY LIEUT.-COL. J. MASSON, M.B., F.R.C.S.E., I.M.S., OFFG. I.G.C.H., BIHAR AND ORISSA. PATNA: SUPDT., GOVT., PRINTING, BIHAR AND ORISSA, 1925. PRICE, RS. 3-2-0.

THE year opened with 546 and closed with 580 hospitals and dispensaries of all classes. The total number of patients treated was 4,102,732 and shewed an increase of over half a million on the figure for 1923. There was a decrease in the numbers attending the travelling dispensaries, however, as some of these were closed down during the year. Hindus treated numbered 3,183,463; Mahomedans 825,112; and Europeans and Anglo-Indians 6,757.

The year on the whole was not so healthy as was 1923, and the death rate among the general population rose from 25 per mille in the previous year to 29.10, the increase being chiefly due to epidemic cholera and small-pox. There were 25,435 cases of cholera treated at dispensaries and hospitals in 1924 as against 3,697 in 1923, but it is noted that the number of deaths which occurred among these cases—344—was actually less than in 1923, when it was 315. (It is doubtful however whether this death rate for 1924 is correct, for in Statement C in the report one notes figures of 22,400 and 240 out-patients treated for cholera with no deaths at all shewn). For in-patients the figures shew a mortality of from 10 to 20 per cent. for different classes of institutions.

Plague was unimportant during the year, and accounted only for a general mortality of 0.3 per mille. The number of small-pox cases treated shewed a marked increase on the 1923 figures; 675 as against 407. Malaria also shewed a definite increase. In connection with influenza, vaccine was supplied by government free of cost to all civil surgeons and jail superintendents. A grant of Rs. 1,200 was also, as usual, given for the purchase of arsenical compounds for the treatment of syphilis in *sadr* hospitals and subdivisional hospitals where an assistant surgeon is employed. No less than 28,669 patients with kala-azar were treated during the year; and Colonel Masson writes that the introduction of urea-stibamine is being arranged for. The scheme for establishing a tuberculosis sanatorium at Sabour has been abandoned, as the place was not considered suitable; instead an annual grant of Rs. 1,500 has been sanctioned to the King Edward Sanatorium, Dharmapore, Simla Hills, to reserve one bed for a non-paying patient from the province. A scheme for the establishment of a sanatorium at Ranchi is under consideration. During the year pulmonary tuberculosis cases treated numbered

10,333, an increase of nearly 2,000 on the previous year. The Filariasis Hospital at Puri is doing splendid work, and its activities have now been extended to investigations in connection with ankylostomiasis and Strongyloides infection,—which latter is stated to be fairly common and possibly responsible for the poor physique of the Oriya. Additional facilities have been provided for the treatment of leprosy at *sadr* and subdivisional hospitals, and there were nine asylums at work in the province during the year.

Surgical operations reached a total of 249,507 with 378 deaths. Financially, the total income during the year was Rs. 24,54,561 and the expenditure Rs. 24,20,045. The maternity welfare scheme at Patna under the supervision of Mrs. Duncan White has been working satisfactorily and a new infant welfare centre there was started under a grant from the Lady Dufferin Fund. A similar scheme at Cuttack under the auspices of the Red Cross Society is also doing good work. In order to increase the supply of "Electrolytic Chlorine" and make it available all over the province, the plant at Pusa was enlarged and it is proposed to establish plants at Patna, Ranchi and Cuttack, these centres to be under the supervision of a specially trained chemical assistant.

The work of the Radium Institute at Ranchi has recently been commented on in our columns, and in 1924 the number of patients treated was 253 as against 189 in the previous year. The Temple Medical School at Patna has been closed and a new medical school opened at Darbhanga; the buildings and equipment for the new Medical College at Patna were almost ready and this institution has since been opened as the Prince of Wales' Medical College.

At the hospitals situated at headquarters of subdivisions in the province sub-assistant surgeons are being replaced by assistant surgeons, under a scheme sanctioned by government in 1923.

ANNUAL ADMINISTRATION REPORT OF THE ASANSOL MINES BOARD OF HEALTH FOR THE YEAR 1924-25.

THIS report is in the nature of a compilation in six parts. Part I deals with the composition of the Board, its staff and establishment, its financial powers and engineering matters; Part II, by Dr. J. W. Tomb, O.B.E., M.A., M.D., D.P.H., Chief Sanitary Officer to the Board, is the administrative report of the year; whilst the remaining parts are taken up by copies of the Bengal Act of 1912 (Bengal Mining Settlements' Act of 1912, as modified up to the 1st October 1915) and *Regulations for the Prevention and Control of Cholera in the Asansol Mining Settlement*. In the appendix to the report a series of interesting plans shew a sanitary well parapet, a model bathing ghat, and standard specifications and plans for model dwellings, *dhowrahs* and isolation huts. This last section will especially appeal to public health officers faced with the question of isolation of cases of contagious disease. In Part I we regret to see that the number of letters received during the year was 1,637 and the number issued 3,033, but we suppose that so large a volume of official correspondence is inevitable in India in connection with so large an undertaking as this Board of Health. The disease to which a correspondent of this journal has called attention—*taniasis rubra* (infection with the "red tape" worm), is universal in this country.

Turning to Part II, which concerns us chiefly, an account is first given by Dr. Tomb of the public health organisation of the district, largely taken from his article in our issue for April, 1925, p. 156. The Settlement includes 263 collieries, 490 villages, the two municipalities of Asansol and Raniganj, and a total population—according to the census of 1921—of 329,356. The chief epidemic diseases are cholera and small-pox, plague being unknown in epidemic form. In 1924-25 there were 444 cases of cholera with 273 deaths—a case mortality of 61.5 per cent., but of 6,364 contacts who took the "essential oils" mixture, not one developed cholera, and no second case of cholera occurred in any infected house in the

Settlement. Of 72 cases treated with the same mixture before the stage of collapse set in, 96 per cent. recovered. Small-pox accounted for 202 cases with 28 deaths; of whom 72 patients were unprotected by vaccination, and of these 15 died. The death rate in the remaining protected 130 cases was 13 or 10 per cent. Primary vaccinations during the year numbered 16,634 and secondary vaccinations 16,825 respectively.

In general, vaccination is afforded free of cost and the attitude of the population towards vaccination is in general friendly, except in the Marwari community in Ranigunj where resort had to be made to legal measures of compulsion.

The general birth rate for the year was 26.02 per mille and the death rate 18.53; for the past five years the number of births has consistently exceeded the number of deaths. As contributory factors to the death rate, respiratory diseases come first, then fevers, cholera, dysentery and diarrhoea. Infant mortality was 138 per thousand recorded births, a figure which compares favourably with those for any other areas in India. "This low infant mortality can only be attributed to the satisfactory hygienic conditions maintained in the Settlement by the activities of the Mines' Board." The death rate in childbirth amongst adult married women was 4.4 per 1,000 births; amongst several hundred deliveries attended by the Board's midwives during the year there was not a single maternal death.

Malarial survey work was continued during the year. Five further wells of special protected type were provided during the year; and the 2,157 children at 89 schools inspected. Lectures and propaganda work are steadily carried on, and five baby shows were held in the Settlement during February and March. In general it is to be noted that the relations between the public health staff and the general public were very friendly and no opposition to measures was encountered anywhere. The erection of proper dwellings, *dhawrahs*, and isolation huts was steadily pushed during the year and the supervision of shops duly attended to.

In the concluding sections of the report the details of the Bengal Mining Settlements' Act of 1912 well deserve study by sanitarians in India, since the powers given appear to be considerably greater than those usually in force in other non-specified areas, with corresponding benefit to the population concerned.

ANNUAL REPORT ON THE MEDICAL AND HEALTH DEPARTMENT, MAURITIUS, 1924.

The population of Mauritius was 387,743 in December 31st 1924. The birth rate has shown a steady increase during the last five years and is now 40.4 per thousand.

The death rate is showing a steady decline and is now 27.7 against 40.33 for the preceding quinquennial period. The highest death rate was in July, as was the case last year; this was due to influenza.

Malaria claims the most victims again this year but the death rate from this infection is declining and in Port Louis, where energetic measures have been taken, it has declined by steady stages from 518 deaths in 1919 to 120 in 1924.

Infantile mortality is again high but is also showing a marked decline being now 129.6 per thousand births.

Midwifery and Child Welfare: The scheme under this heading is mainly supported by bequests and voluntary contributions but is also aided by Government grants.

Two crèches exist for taking in infants deprived of good food and proper care; two other crèches for looking after infants during the day while the mothers are at work.

A scheme for the training of midwives has been in existence for some years; these midwives are distributed throughout the colony. A difficulty about the employment of these midwives [which is also the difficulty in India] arises; the people prefer the old-fashioned unqualified midwife who works for much less remuneration and will also turn her hand to household

duties such as washing linen, while the mother is in bed. The next problem is to persuade the people to employ the qualified midwives. There are 518 unqualified persons who admit to practising midwifery, the actual number that do practice it is probably much greater.

Two nurses have been appointed to undergo special training as health visitors.

Plague: This disease was first observed in 1899 when 1,416 cases and 1,117 deaths were reported. The disease has undergone a more or less steady decline down to the year 1918 when no cases were reported. Cases were again observed in 1921. In 1924, 161 cases and 144 deaths have been reported, this shows a high death rate, almost 90 per cent.

During the year 83,263 rats were destroyed, of those examined just over 1 per cent. were found to be plague infected.

Failure to eradicate plague and incomplete success of the anti-rat campaign are attributable to the following causes:—

(i) Lack of co-operation on the part of the vast majority of the community, due mostly to ignorance, apathy and scepticism.

(ii) Defective housing conditions.

(iii) Overcrowding in small, ill-ventilated rooms and insanitary mode of living of the general mass of the population.

(iv) Non-rat-proof grain stores. In addition to the grain stores proper, every Chinaman's shop is an actual grain store.

Rice, other grain and gunny bags are stored all over the town in non-rat-proof buildings.

The remedies suggested are:—

(i) Educational propaganda.

(a) The teaching of hygiene in primary schools and girls' secondary schools which was started several years ago has not shown its beneficial effects fully yet, but it is only gradually that these effects may be expected to be materialized. The teachers after having personally derived the fullest benefit from the lectures of the public health officer, should take to heart the imparting of the elementary principles of hygiene to the schoolboys and girls. At the same time, hygiene should be taught in all schools and colleges without exception.

(b) Cinema films, lectures, illustrated leaflets and posters.

Several cinema films and a complete portable projection (electric power) apparatus have been received. The titles of the films which have already been received are: "Mosquitoes and Malaria," "Swat that fly," "The Rat Menace" and "Ankylostomiasis." The films have been shown free of charge in schools and elsewhere and free open air exhibitions will also be given.

Several leaflets (bulletins) have already been published in English and French and on occasion arising this procedure will be continued.

(c) It is expected that with the complete and efficient training the sanitary staff is now undergoing, sanitary officers will be conscious of and alive to the educational mission they are entrusted with towards the community as regards all the aspects of public health.

(ii) and (iii) More houses, better housing conditions and domestic hygiene.

Of enteric fever, 107 cases were notified; this is the lowest figure yet recorded.

A wave of diphtheria swept over the districts of Plaines Wilhem and Moka; 2/3rds of the total number of cases occurring during the months of October, November and December. No cases of small-pox were reported. Altogether 10,944 children were vaccinated; 10,429 were reported as successful at first attendance.

Malaria: Routine examination of the blood of school children was undertaken to ascertain the infection rate. Out of 6,884 children examined 378 or 5.4 per cent. were found to be infected.

Leprosy is not a notifiable disease. There are only 38 inmates in the leper asylum.

It is probably common enough in the colony. Every day cases are met with in the streets of Port Louis and elsewhere.

No law exists for the compulsory segregation of lepers except convict, pauper or vagrant lepers. They wander about at liberty living with their families and transmitting the disease.

There is no power to prohibit marriages between or with lepers, hence the taint continues to be spread.

In the draft Public Health Ordinance leprosy is made notifiable and power is given to the Director of the Health Department to make regulations providing for the restriction of lepers in regard to various trades and occupations. It is hoped that this ordinance will soon be passed and put into force.

Pulmonary Tuberculosis.—This disease is not notifiable yet in Mauritius. Provision for its compulsory notification has been made in the draft Health Ordinance.

The mortality due to pulmonary tuberculosis represents 8.2 per cent. of the total deaths for 1924 against 7.7 per cent. in 1923. The months with highest deaths were November (94), August (91), October (88), and those with lowest deaths, January (49) and February (48).

Ankylostomiasis.—During the year under consideration the hookworm campaign, carried on by the International Health Board of the Rockefeller Foundation on a three years' agreement started in May 1922, examined a total of 42,085 persons in the four districts where soil sanitation had been completed, viz. Port Louis, Moka, Grand Port and Savanne. The findings are shown in the table hereunder:

SUMMARY OF HOOKWORM CAMPAIGN—1924.

District.	Census.	Examined.	POSITIVE FOR					
			Hookworm.	OTHER HELMINTHS.				
				Ascaris.	Trichocephalus.	Strongyloides.	Oxyuris.	Tœnia.
Port Louis	3,551	2,838	1,492	1,248	2,469	6	12	..
Moka	7,226	5,509	4,506	3,087	2,539	30	15	1
Grand Port	36,748	25,136	18,855	13,198	11,640	9	7	..
Savanne	12,573	8,602	6,856	4,693	3,228	6	44	..
Total	60,098	42,085	31,709	22,226	19,876	51	78	1

Water-Supply.—The water-supply of Port Louis is derived from Grand River North West and Bathurst Canal. Government establishments and some private firms and buildings are provided with Mare-aux-Vacoas water. The first two supplies of water are unfit and unsafe. It is hoped that the chlorination plant under erection at Pailles, in the bed of Grand River N. W. will soon start working and that filtered chlorinated water will be substituted for the crude, impure water that 95 per cent. of the inhabitants of Port Louis are obliged to consume.

The fact that the water-supply is a most important factor towards the health of a community is now almost universally realized in Mauritius. The various District Boards have taken the question in hand and the water supplies of country districts are being largely improved and extended, mostly by piped supplies from pure sources or unpolluted springs and rivers.

Milk.—During the year the Director, Medical and Health Department, submitted to Government a comprehensive scheme with accompanying regulations dealing with the control of conditions in which milk is and should be produced and sold.

These regulations necessitating proper structural conditions could not be dealt with under present building regulations and a bill has been prepared giving the sanitary authority power to deal with buildings. It is hoped that in the near future this bill will become an accomplished fact.

Little or no attempt to secure radical structural improvement of byres has been accomplished. The existing byres are unhealthy, overcrowded and badly ventilated.

Paris Green as a Larvicide for Anophelines.—This dye has been tried to a small extent in Port Louis with very good results. In the first experiment the dye was diluted with street dust in the proportion of 1 part Paris green (by measure) to 9 parts street dust. A small barachois 30 feet long, 10 feet broad and about 1 foot average depth, in the estuary of the St. Louis river was used for the first trial. This pool was one of a pair which contained quantities of green alga growing in the brackish water. The pool was inhabited by small fish, water snails, agnionid larvæ and larvæ of *Anopheles costalis*. The mixture of dye and dust was thrown by hand on the surface of the water until the whole surface had been covered with a fine green scum.

At the end of 30 minutes trial dips were made and living *costalis* larvæ were obtained. These were taken back to the laboratory and transferred to clean water. They all died during the course of the afternoon. Larvæ from the control pool a few yards distant from the experimental pool, collected and kept in the laboratory under the same conditions, were alive the following morning.

The pool was revisited 23 hours after the application of the dye. The following note describes the conditions met with:—"Water clear and limpid. Large numbers of small stunned snails present. Fish stupe-

fied and easy to catch but no dead fish seen; 20 dead *costalis* larvæ recovered. No living larvæ found. Larvæ of agnionidæ alive. Larvæ in control pool healthy." Subsequent visits showed recovery of snails and fish.

Later, collections of surface water which had been found to contain *A. costalis* larvæ were treated with a mixture of Paris green and dry sawdust, the dye being mixed with the sawdust in a strength of 5 per cent. by volume. The larvæ were all killed.

It was noted that in some of the pools in which anopheline and culicine larvæ occurred together, the anopheline larvæ were sometimes the only ones to be killed by the application of the dye. In this connection the following note describes an observation made one evening:—

"May 16th.—*A. costalis*, *mauritanus*, *funestus* and *Stegomyia* larvæ placed in some water. Control batch put aside. Larvæ observed. Feeding well. Anophelines lie on surface of water and feed by rotating head through an angle of 180° and sweeping the surface of the water with their brushes from below. If water shallow enough they may feed on bottom. Lie at rest quietly feeding. *Stegomyia* very active, feeding mainly

on bottom of dish and sometimes in mid-water. Do not often sweep surface.

"5-30 p.m.—Paris green dusted on water.

"Anopheline larvæ ate much greater quantities of floating Paris green than *Stegomyia* did. Anopheline larvæ appeared to become paralysed. At 10.30 p.m. the anophelines were still alive, but very sluggish in their movements, the *Stegomyia* larvæ were apparently unaffected.

"By morning all the larvæ and one cyclops were dead. One pupa was alive after 24 hours and subsequently hatched. The control batch were normal."

It would appear that the apparently selective action of the dye is due to the different feeding habits of the larvæ.

The surface feeders absorb a much greater quantity of the substance than the bottom feeders, and suffer accordingly. This is also the probable explanation why fish and other aquatic creatures are immune to quantities of the poison which are fatal for anophelines.

Further observations will be reported in due course.

Markets.—The markets and abattoir of Port Louis were frequently inspected by the sanitary authority during the year. No steps were taken by the municipality to remedy the structural defects of these places or to instal satisfactory appliances and fittings; 435 unclaimed dogs, captured by the police in the markets as strays, were destroyed in a humane manner.

In spite of the activity shown by the police there are still too many uncontrolled dogs roaming at large in the town.

In the extra urban areas 57 stray pigs were shot by the police.

Tuberculosis in cattle at Plains Wilhems.—A large number of cattle have been found to be tuberculous when slaughtered in the Rose Hill abattoir. Accordingly the Director of Agriculture is organizing a campaign in the district to extend the information thus obtained, whereby the tuberculin test is to be applied section by section in the district. It is suspected that the stall accommodation provided by private owners is insufficient.

Training of Staff.—Classes of instruction have been held for Sanitary Inspectors and Guards, in which the Drainage Engineer has assisted.

Mahébourg has an open market which is utilised practically twice a week by occasional sellers for some 3 or 4 hours at a time.

In all three districts meat is sold in specially approved shops—control if difficult is still possible. Not so much can be said in respect of fish which is hawked in baskets, and of vegetables which continue to be exposed for sale on tablets under the verandahs of Chinamen's shops where they receive dust from the street. A few years ago an article in the building law was introduced which did away with the possibility of using open verandahs along high roads for the purpose. Unfortunately upon representations received from interested quarters a return to the old objectionable system was rapidly made.

The ratio of insane to total population is 17.69 per 10,000. It is interesting to compare this rate with the average total insane rate for European countries which is 40 per 10,000; that for England and Wales, as given by the Board of Control for the year 1923 being 34.40 per 10,000 of population.

The chief reasons for this marked difference between the Mauritian and European total insane rates seem to be: (a) the more acute struggle for life in Europe and the consequent increased worry, anxiety and privation; (b) the much greater prevalence of general paralysis of the insane in Europe, where 15 to 20 per cent. of all admissions into mental hospitals suffer from this disease. Another reason may be that a higher standard of sanity is demanded in Europe. In Mauritius, although syphilization and civilization are both advanced, general paralysis is practically non-existent.

(ii) The insane rate for Creoles was 34.51 per

10,000, that for Indians and Chinese being 10.92 and 17.79 respectively.

The insane rate for Creoles is, therefore, more than three times that for Indians. It would appear that the greater prevalence of insanity among Creoles is accounted for by the fact that the Creole is, as a rule, more highly strung than the Indian and is, therefore, more prone to succumb to psychic trauma than the more phlegmatic and fatalistic Indian. Again, unemployment is more rife among Creoles who, as a class, shew a natural aversion to agricultural work, hence worry and privations are more frequent ætiological factors in the causation of insanity among them.

(iii) The male insane rate for all classes was 19.53 per 10,000 and the female rate 15.72.

Contrary to what happens in most countries the male insane rate in this Colony is higher than the female rate.

ANNUAL CLINICAL REPORT OF THE GOVERNMENT HOSPITAL FOR WOMEN AND CHILDREN, MADRAS FOR THE YEAR 1924. BY LIEUT.-COL. C. A. F. HINGSTON, C.I.E., O.B.E., I.M.S. MADRAS: SUPDT., GOVT. PRINTING, 1925.

This report shews in statistical form the enormous volume of work carried out by this celebrated hospital and teaching school. Colonel Hingston was in charge until July, when he proceeded on leave, and Major W. C. Gray, I.M.S., replaced him during the rest of the year.

Obstetric cases numbered 2,981, and gynecological cases (including diseases of pregnancy), 3,644. There were in all only 67 deaths amongst 2,908 patients delivered during the year; including 4 cases of eclampsia, 13 of puerperal septicæmia, and 24 of non-puerperal origin.

In all 38 cases of eclampsia were treated during the year, of whom the 4 mentioned previously died; of these 38 cases in 22 birth was by natural powers; in 12 cases forceps were used, and once Cæsarean section had to be resorted to; 22 of the patients were primiparæ, and 16 multiparæ; 40 children were born, but only 17 of them living. A detailed and most interesting table gives full particulars of these cases.

Turning to the total 2,908 deliveries recorded,—which number is arrived at by excluding patients delivered on the way to hospital, or elsewhere, etc.—1,801 had natural and not prolonged delivery; 414 had difficult delivery; 107 preter-natural delivery; 460 were complex cases; and 126 cases of abortion. One patient gave birth to quadruplets; in 10 cases there was rupture of the uterus; whilst the chief incidence of abortion—22 out of 42 cases treated—was in "pyrexia of uncertain origin." The obstetric operations carried out numbered in all 999, and included 372 instances of application of forceps; 64 of podalic version and extraction; 22 Cæsarean sections; 13 of morbidly adherent placenta; and 377 of immediate suture of the perineum.

The ratio of different classes of patients admitted is shewn in the following figures:—Europeans and Anglo-Indians, 291; Hindus, 1,163; Mahomedans, 65; which well illustrates the unwillingness of the Mahomedan community to avail themselves of the facilities provided by the hospital.

Of the 2,908 deliveries, 2,544 were vertex presentations, and 89 breech or foot, whilst 47 were cases of plural births. No less than 2,211 went to full term, but 694 were premature or aborted.

Of 1,801 cases of natural labour lasting less than 24 hours, the percentage of primiparæ was 23.15, with an average duration of 12.37 hours as against one of 7.81 for multiparæ. In the class of difficult labour, with presentation of the head, face or brow, in 346 deliveries by forceps the maternal mortality was 2.6 per cent., whilst 2 out of 17 cases of Cæsarean section died. Of preter-natural labours there were 107 cases, mostly of breech presentation, where one or more parts of the body presented; no less than 65 of these patients were delivered by natural powers. Complex labour included

chiefly cases of plural births, eclampsia, post-partum hæmorrhage, placenta previa, descent of the funis, and adherent placenta, or disease of the decidua or ovum. With regard to plural births, there were 97 children born in 47 labours,—all twins, with the exception of one case of triplets and one of quadruplets. Of these 97 children, 59 were born alive, and 35 mothers were delivered by natural powers.

Of the total 2,832 babies born during the year, as the result of 2,782 deliveries (excluding 126 abortions), 2,261 or 91 per cent. were of full term, and 571 premature. Of indications for different obstetric operations, podalic version with extraction was chiefly called for in cases of the foetal head not being fixed, transverse presentations, and cases of prolapse of the cord: podalic version was called for in 34 cases of breech or foot presentation: forceps were called for chiefly in connection with maternal or foetal distress—287 out of 372 instances—; for persistent occipito-posterior presentations, for cases with the cord around the neck, and in cases of eclampsia. The proportion of live births in forceps cases was 92.5 per cent.,—a most satisfactory figure. Caesarean section, 22 cases, was chiefly indicated in cases of previous Caesarean section, generally contracted pelvis, and complex pregnancy. 17 out of 22 mothers survived, and 15 out of 17 children; (the discrepancy in the figures being explained by section with complete hysterectomy for 2 cases of cancer and one of ruptured uterus).

On the gynaecological side 806 operations were carried out in all, chiefly opening of abscesses, ventro-fixation of the uterus, dilatation of the cervix uteri, repair of vesico-vaginal fistula, salpingectomy, etc. The number of deaths was 27 or 3.3 per cent.

Although this report is presented in the form of statistical tables, yet it will interest all practising obstetricians in India.

REPORT ON THE PUNJAB MENTAL HOSPITAL, LAHORE, FOR THE YEAR 1924. BY COLONEL C. H. BAKHLE, I.M.S., I.G.C.H., PUNJAB. LAHORE: SUPDT., GOVT. PRINTING, PUNJAB, 1925. PRICE, RE. 1-4-0.

THE daily average population of the Mental Hospital in 1924 was 24.26 less than in the previous year, the decrease of about 3 per cent. being attributed to the fact that the charge for maintenance of patients was raised at the beginning of the year from Rs. 16 to Rs. 20. This conclusion is borne out by the figures as to receipts from paying patients which, even allowing for arrears not yet collected, did not increase to anything approximating the rate of increase in the fees. Even with this decrease the daily average population was in excess of the capacity of the hospital, and at times the overcrowding was excessive. The Inspector-General of Civil Hospitals observes that the completion of the new criminal section with accommodation for 200 patients will relieve the congestion in the male hospital, but that this section has not yet been occupied as Government sanction has not yet been received for the extra staff that will be necessary. Other improvements in the accommodation for patients and staff have been held up owing to the necessity for economy in recent years, but it is hoped that most of the deficiencies will be remedied in the current year.

The increase in the number of cases discharged as cured,—a number amounting to about 16 per cent. of the daily average population,—is a most satisfactory feature of the year's report, and in view of the results obtained the slight financial loss due to the freer employment of patients in open air occupations may be disregarded.

The death rate was higher than in the previous year, amounting to 11.31 per cent. of the daily average population. This, however, is equal to a rate of only 12.8 per mille as compared with the general provincial rate of 43.4 per mille, and, considering the peculiar nature of the population concerned, the figures bear eloquent testimony to the care with which the inmates of the institution are looked after.

The expenditure per head of the daily average population, excluding expenditure on work done by the Public Works Department, amounted to Rs. 294 as compared with Rs. 287 in the previous year.

Captain C. J. Lodge Patch, I.M.S., was in charge as Medical Superintendent throughout the year, assisted by Dr. Thomas, the Deputy Medical Superintendent. The Revd. Mother Superior and the Franciscan Sisters continued to discharge their voluntary duties of looking after the female-patients in the hospital with the same self-sacrifice as in previous years.

ANNUAL REPORT ON THE PATNA MENTAL HOSPITAL FOR THE YEAR 1924. By LIEUT.-COL. H. R. DUTTON, M.R.C.P., I.M.S., SUPERINTENDENT. PATNA: SUPDT., GOVT. PRINTING, BIHAR AND ORISSA, 1925. PRICE, RE. 1.

THIS report by Colonel Dutton contains interesting matter, and should be read in the original by medical officers concerned with prisons and mental hospitals in this country.

The number of patients at the beginning of the year was 284; 70 were admitted during the year; and the average daily strength was 243. Recoveries numbered 35. "The question of discharge of those patients (mostly females) who have recovered, but are more or less friendless and homeless, is a difficult problem to solve," writes Colonel Dutton.

"It is considered unwise to throw them out on the world, because if discharged the stigma of being in a mental hospital is likely to stand in their way of getting any employment or a shelter and in consequence they will gradually swell the number of beggars, or most likely of criminals or 're-admitted' cases. On the other hand all authorities agree that they should never be kept within the precincts of a mental hospital, where the surroundings are certainly not congenial and common humanity demands that they should be segregated from insane persons as soon as they are convalescent. Under existing conditions they soon contract an 'asylum habit' and thus become a continuous burden to the State.

I would therefore suggest for the consideration of the Government the desirability of construction of separate convalescent wards, outside the boundary wall of the hospital, and the opening of classes in various branches of home industry under properly trained work-master and work-mistress, and would also draw the attention of the generous public to the urgent necessity of starting 'homes' and agricultural farms for these unfortunates."

The number of patients treated for disease other than mental was 376, with a daily average sick rate of 34.9; dysentery and ankylostomiasis were the two chief complaints; and it is especially difficult to keep down the incidence of these diseases in patients in a mental hospital many of whom are of filthy habits, and often both coprophagic and geophagic. Want of a proper segregation ward has been very much felt of recent years. Only five deaths occurred during the year, the lowest figures recorded since 1912.

The number of criminal lunatics has shewn a steady increase of recent years, and 131 were admitted during 1923. Colonel Dutton comments on this class of patient as follows:—

"Except in those cases where the accused persons are too insane to draw the attention of the trying Courts as to their mental condition, a plea of insanity is taken by the defence after some time has elapsed since the commitment of the crime, and the Court then directs the investigation of the mental condition of the accused. It becomes an extremely difficult problem for the medical men concerned to form any opinion at this stage as to whether or not the accused was of unsound mind at the time he committed the crime, and even if he was so, whether his unsoundness of mind was of such a nature as to have negatived his criminal responsibility. There is a possibility of miscarriage of justice one way or the other in such cases. Or cases may occur where

no such plea of insanity having been taken, and the mental disorder being of too trivial nature at the time of trial to escape attention of the Court, people have been convicted but while in prison undergoing the sentence, they show unmistakable signs of such types of mental disorder which cannot but be of a long standing nature. From the statement given above it will be noticed that amongst people convicted of crime but later showing symptoms of insanity, 2 (grievous hurt) suffer from dementia præcox, 1 (murder) suffers from epilepsy and 1 (murder) suffers from dementia paranoides. Now all will agree that the diseases mentioned above are of very very long-standing nature, starting possibly from childhood. It becomes then a pertinent question to ask as to whether or not these crimes were the direct result of their diseases, and if so the patients should not have been convicted at all. Then again the question of 'malingering' mostly among the convicts is a problem to be always kept in mind, the detection of which requires special observation and knowledge of mental disorders on the part of the prison authorities. Not infrequently cases of malingering have been mistaken for true insanity, due to either want of special knowledge or intelligent observation or collusion of the convicts with the warders staff.

To obviate the above-mentioned defects I would suggest that all prison doctors should undergo a thorough post-graduate training in a mental hospital, and that they should examine and record the mental condition of all prisoners, especially the under-trial prisoners, no matter whether a plea of insanity is taken or not. And in case of the latter, if they have reason to suspect any unsoundness of mind, they should voluntarily inform the trying courts of their finding and opinion."

The principal types of insanity dealt with were imbecility, dementia præcox, maniac depressive and confusional insanity, and epilepsy. One patient developed insanity shortly after an acute attack of malaria, and malignant tertian parasites were found in his blood. Puberty, adolescence, child-bearing, mental stress and strain, malnutrition and senility are all contributory ætiological factors.

An attempt was made during the year to issue plain clothing to all patients instead of the prison garb formerly in use. There was a sufficiency of blankets but other bedding could not be issued owing to stringency of funds. The scale of diet was improved, but—as Colonel Dutton remarks—one cannot expect much variety in diets when one cook on Rs. 12 p.m. has to cook for more than 300 patients a day! As no recreation hall is available, patients were taken instead in batches to a theatrical performance; whilst gramophones and playing cards were issued.

The total expenditure during the year was Rs. 77,563; or an average total per head of Rs. 260. With regard to the staff a serious position arose, but was boldly tackled.

"The work done by the subordinate keeper staff was, with a few exceptions, not altogether satisfactory. Owing to their ignorance, laziness and generally unsympathetic attitude, they failed to realize that this place was a hospital and the unfortunate inmates were patients to be nursed and looked after and not convicts under jail warders. When the present Deputy Superintendent, Dr. J. Roy, tried to inculcate the principles to be followed in the treatment of patients and insisted on the observance of rules laid down in the *Bihar and Orissa Lunatic Asylum Manual*, there was a general strike amongst the keeper staff. Dr. Roy managed the situation tactfully and brought round most of the keepers, but 13 remained obdurate. Both from considerations of discipline and of common humanity it was not possible to retain in the service men who refused to carry out orders given with a view to secure proper attention to the primary needs of the sick inmates of the mental hospital, and so I dismissed these 13 men from government service. This step undoubtedly produced some salutary effect, but still much remains to be attained. If the institution is to be looked upon as a hospital then the proper nursing and supervision of the patients should

be secured by the employment of an adequate number of nurses—male and female—recruited from fairly educated classes who can make intelligent observation about the conduct of the patients and also constantly supervise the work of these ignorant and illiterate keepers. I would therefore suggest that this point may be carefully considered while making appointments for the new hospital at Kanke."

In general, concludes Colonel Dutton, it is always extremely difficult to get correct and detailed information about the family and previous history of patients. The descriptive roll which accompanies the patient on admission has to be filled in by a police officer, and the information thus collected is quite valueless from either a scientific or therapeutic point of view.

Major A. W. Duncan, I.M.S. held charge of the hospital as Superintendent from July to November, during Colonel Dutton's absence on leave; whilst Dr. Jyotirmay Roy, M.B., D.P.M. (Eng.), returned from England, where he had received a special training in mental work, and was Deputy Superintendent throughout the year from January 25th.

The former mental hospital at Patna is to be done away with, and the new mental hospital for Indians at Kanke, Ranchi, is to take its place in 1926. It is hoped that the facilities afforded at Kanke will be very much better than those at Patna previously.

Correspondence.

UREA-STIBAMINE.*

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Of the pentavalent antimony compounds that are in common use in the treatment of kala-azar the preparation known as urea-stibamine is probably the one that has been used most extensively. At the Calcutta School of Tropical Medicine we have tried out a large number of antimony compounds and have selected a number of these as being of special value. When urea-stibamine was first introduced by Dr. U. N. Brahmachari and Mr. Judhistir Das, M.Sc., the former very kindly sent me a small sample of this preparation for trial; I only treated a few cases but the results were not very good. The published reports of other workers indicated that the preparation usually gave very much better results than I had obtained, but as I was unable to get further samples of this preparation I could not make a further trial of its therapeutic value for some time. During the last year however Dr. Brahmachari has very kindly given me a generous sample of his preparation and I have been enabled to treat a further series of cases; another small sample sufficient to treat one case was supplied to me by Mr. Chatterjee of the Chemical Department of this School, and the Union Drug Co. sent me a sample which they stated had been prepared according to Dr. Brahmachari's published formula.

The fact that urea-stibamine has not been widely used in our hospital has created an impression in certain quarters that we do not consider it a valuable drug in the treatment of kala-azar. This is of course not the case; and my letter is written with the intention of dispelling from the minds of your readers any impression of this nature.

I shall in due course publish the final results of the treatment of this series of 36 cases; but as there is no means by which one can be absolutely sure that a patient is cured, even spleen or liver puncture occasionally giving misleading results, it is my usual

* Please see footnote on p. 162 in which it is shewn that the name urea-stibamine may not be used by any manufacturer of this substance, except Dr. U. N. Brahmachari. We understand that the Union Drug Company are now placing the same compound on the market under the name "Stiburea."—EDITOR, I.M.G.

practice to follow cases up for at least six months before assuming that they are finally cured.

The immediate results of treatment can be summarised as follows:—

Thirty cases were discharged cured, two cases had a course of treatment which should have been sufficient to cure even a resistant case, but they did not improve at all under treatment; two only had a short course of injections but insisted upon a premature discharge from hospital; these were clinically improved but still harboured the parasites of the diseases; and two died during the course of treatment.

Of the 30 cases that were discharged cured 25 had previously received no form of treatment; the mean of the number of injections which were administered to these was 12.1 and the mean of the total relative dose was 3.16 grammes per 100 lbs. body weight. The 5 cases that had previously received a full course of treatment and had subsequently relapsed received a mean number of injections of 15.8 and a mean total relative dose of 4.6 grammes per 100 lbs. body weight.

The reduction of the temperature was in most cases rapid, one case was afebrile throughout the course of injections and three other cases ran an irregular temperature throughout which fell to normal immediately the treatment was discontinued. Of the remaining 26 cases the mean of the number of injections that were administered before the definite cessation of fever was 5.5.

In every case the diagnosis was made by spleen or liver puncture and the cure confirmed, as far as it is possible to confirm it by this means, by spleen or liver puncture with culture of the material.

Comparison of the two brands of urea-stibamine:— There does not appear to be any difference between the therapeutic action of each of the two principle brands of the preparation which we used. Twenty-two cases were treated with the sample sent to me by Dr. Brahmachari and thirteen with the sample received from the Union Drug Co. Of the deaths that occurred one was in each series. The two cases that resisted treatment were in the former series but both of these cases have resisted all forms of treatment and are still uncured. The mean total relative dose that was administered to the previously untreated cases was 3.14 grammes in the former series and 3.17 grammes in the latter and the total number of injections was 12.7 in the former and 11.3 in the latter. The rate of fall of temperature was also almost equal in the two series; in the former series the mean of the number of injections administered before the cessation of fever was 5.6 and in the latter series 5.3.

The toxicity of the various samples submitted for trial was tested very carefully before use; the relative toxicity to mice appeared to be practically the same in each sample tested and I am told by Major R. N. Chopra, who is at present engaged in investigating the various antimony compounds pharmacologically, that the action on blood pressure and respiration is almost exactly similar in the case of the Union Drug sample and a sample that he purchased from Messrs. Bathgate & Co., labelled "Urea-stibamine (Brahmachari)".—Yours, etc.,

L. E. NAPIER, M.R.C.S., L.R.C.P.
Kala-Azar Research Worker.

SCHOOL OF TROPICAL MEDICINE,
CALCUTTA,
18th February 1926.

MEDICAL RELIEF IN INDIAN RURAL AREAS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Medical education in India is becoming more and more difficult every day, more costly, and of longer duration, especially in the Calcutta University where the course lasts six years, and where some students even take eight, nine or ten years to qualify. On the other hand the need in the *mofussil* for doctors of the assistant surgeon class is very acute; it is easy enough to get men of the assistant surgeon class in Calcutta,

yet in the *mofussil* areas it is very hard to find one within a five mile radius. In comparison with the conditions in other countries the provision of skilled medical relief in the rural areas of India is inadequate. People in Calcutta have ready access to qualified medical men, lady doctors, qualified midwives; but the want of such provision in the *mofussil* is acute. It is often impossible for a *mofussil* patient to find a qualified medical man within five miles of his home, and the greater the distance the doctor is called, the greater his fee. The sub-assistant surgeons who do see such patients, are often hard put to it when a second opinion is wanted, as no doctor of assistant surgeon status is near.

Much is done by the medical mission hospitals. I cannot forbear in this connection to mention the work done by Dr. Muir when he was in charge of the Khulna Mission Hospital in the Burdwan district; within a radius of ten or twelve miles of his hospital medical relief was afforded extensively to the masses, men, women and children alike.

A very considerable proportion of students at the Calcutta Medical College qualify in their sixth year, and thanks are due to the Senate of the University for the very large numbers of qualified medical men which they pass into practice. But cannot something be done to increase the number of trained medical men of assistant surgeon grade in the *mofussil* areas?—Yours, etc.,

S. P. NAG, L.M.S.

GOZINA, DASPUR,
HOOGHLI DISTRICT,
3rd February 1926.

QUACKERY IN THE MOFUSSIL.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In the interests of the public safety it is high time that something was done to put a stop to the pernicious habits of medical quacks in India. Many lives are lost owing to the use by these gentry of excessive and disproportionate doses of poisonous drugs. Being blissfully ignorant of the correct posology, they will not hesitate to administer any dose whatever, when the qualified medical man will think not twice but thrice before he prescribes at all. Were the village quack innocuous, he might be tolerated; when he becomes a danger to the lives of the community, it is time that he should be suppressed. And dozens of patients die, with their relatives in complete ignorance of the fact that it is the quack "doctor" who has killed them.

The present is the age of injections. Even illiterate village folk prefer to have what they term "injunctions" by way of treatment of difficult cases. The quacks—whose numbers are legion—are one and all armed with a cheap Japanese hypodermic syringe, and they will administer anything or everything hypodermically; if strychnine succeeds with one patient it is tried on the next, with little or no regard paid to dosage.

Further, these "doctors" have each their own coterie of supporters—whether interested or disinterested financially—more usually interested, since those who are disinterested are but few among many. To the ordinary humble villager it would appear as if the quack, with his modern syringe and his armamentarium of hypodermic drugs at the cheapest of rates per visit, is a boon from Heaven; the other side of the shield has never been shewn to these people.

Something should be done to put a stop to the universal illegitimate medical quackery in India. I know but little of homœopathy, but I understand that its cardinal principle is the administration of excessively minute doses of drugs which will produce symptoms analogous to those from which the patient is suffering. Perhaps the quacks could be compelled by law to become homœopaths, and to administer only homœopathic doses: their mistakes as to dosage, etc. would then be far less dangerous.

There are various ways of killing people and there are also various ways of declaring such methods illegal.

But not only is the quack who kills his patients exempt from prosecution and responsibility; he is actually paid a fair remuneration by the relatives of the deceased for having killed him.

We—duly qualified medical men—receive scores of official circulars about the necessity for keeping all poisonous drugs in a "poisons' almirah"; the key of which is not even to be trusted to our own compounders. But the village quack is allowed free and unlicensed use—hypodermically, as often as not—of the same poisonous drugs; he may administer them in any dose, and in complete ignorance of their actions.

In the name of common humanity I would appeal to Government to do something to stop this dangerous and criminal system of universal quackery, whereby the lives of our people are endangered and often lost.—Yours, etc.,

H. DAS GUPTA,
Bengal Medical Service.

DAULATPUR, KHULNA,
6th February 1926.

"THE TREATMENT OF MALARIA WITH PERACRINA 303."

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In common justice to myself and to the manufacturers of Peracrina 303, I feel it my duty to comment shortly on the article by Dr. William Fletcher, published under the above title in the *Indian Medical Gazette* for November 1925.

To begin with, Dr. Fletcher's disparagingly worded conclusion as to the composition of Peracrina 303, though apparently contradictory to the description given of the drug by the makers, does not in reality essentially differ from it. It is well known to every analytical chemist and every qualified medical man that "yeast cells" consist almost entirely of albuminates rich in medicinal value, and that unless the cells were "dead," they could not be used in an inorganic chemical compound; further, that "a little starch" (or wheat flour) is invariably employed in the making up of pills, because of its binding properties. Acriflavine may be truthfully described as a "yellow dye," though "an acridine dye stuff" is, of course, a more exact definition.

The term "specific albuminates" is used by the makers with reference to chemical classification, rather than in the strictly medical sense. Had they been addressing the general public, they would have employed the practically synonymous and equally accurate expression "specially prepared yeast." Their advertisement, however, was intended for scientific men. I may add that the chemical process by which Peracrina 303 is manufactured is based on the English patent No. 208599/23.

The doses recommended in the advertisement are 6 to 12 pills daily for adults and 4 to 10 for children, according to the patient's state of health. This point is frequently emphasised in the Peracrina literature, where it is made perfectly clear that the medical man is quite at liberty to exercise his discretion and vary the dose.

That "it is impracticable to administer Peracrina for a long period.... in the large doses recommended by the makers," and that it "is too expensive for general use" are, no doubt, correct conclusions with regard to the Federated Malay States. Social and commercial considerations such as these are, however, surely out of place in a scientific treatise, apart from the fact that Dr. Fletcher is scarcely in a position to decide whether they are applicable to other countries.

The clinical tests made in Kuala Lumpur were of much too short duration for Peracrina to destroy the malaria parasites.

Dr. Fletcher's fifth conclusion is calculated to give a very misleading impression to the uninitiated. In the treatise on my experiences in the malaria districts of South Russia, I certainly stated that Peracrina "was found to be at least equal to quinine in the treatment of malaria," but I also laid stress on the fact that its action was essentially different. I do not advocate its

use "in place of quinine,"—to reduce high fever and effect an immediate but temporary cure; on the contrary, I have always declared that its anti-febrile properties are far inferior to those of quinine. I do, however, maintain that:—

(1) a complete course of Peracrina treatment (from six weeks to three months, or, occasionally, even a little longer) invariably cures chronic malaria completely and permanently by annihilating the parasites;

(2) in certain selected cases it may be used with advantage in combination with quinine to combat and finally completely cure acute malaria.

(3) It frequently proves effective in cases of so-called "quinine-resistance."

Even in the advertisement it is stated that during the first three weeks of treatment the blood tests may show an increase of parasites, and the temperature may rise. I account for this on the theory, justifiable by the well-known properties of its components, that Peracrina forces the parasites latent in the spleen and other affected organs to come out into the peripheral blood, where it is able immediately to combat and ultimately to annihilate them. This theory is confirmed by the speedy return of the spleen to a normal size, a characteristic symptom totally ignored by Dr. Fletcher.

(I should mention, too, that not only "the clinical histories of three cases" cited by Dr. Fletcher, but also several others, were reproduced as illustrations in my treatise.)

In view of the statements made by Dr. Fletcher under the heading "Clinical Tests of Peracrina in Kuala Lumpur" (paragraphs 1 and 2), it is comprehensible that he found the drug little suited for use in the hospitals of the Malay States. As, however, the conditions there are such that "it was impossible to give them (the patients) the three months' treatment recommended by the Haco Company," (he "was not able to detain these people in hospital for more than ten days or a fortnight"); and that "the question of permanent cure cannot be investigated accurately," he would, in my opinion, have shown a more open-minded spirit, (if, indeed, he experimented at all in the circumstances), had he refrained from writing and publishing an article in a tone calculated to deter others, perhaps more favourably situated than himself, from testing the value of Peracrina 303.—Yours, etc.,

J. WALKER, M.D.,
Médecin adjoint du Laboratoire
Bactériologique à Elisabethville,
Prov. Katanga, Congo Belge.

BRUSSELS,
2nd February 1926.

(Note.—The above letter is published with a view to enabling our readers to hear the case for Peracrina as well as the case against. We are still unconvinced that any evidence has been produced of the curative action of Peracrina, but, doubtless the firm which issues the drug will take care that all possible evidence in its favour will be made available. EDITOR—J.M.G.)

THE PROVOCATIVE DIAGNOSIS OF MALARIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to the two methods of driving parasites from the spleen into the peripheral circulation as described by Lieut.-Col. Jeudwine in last month's issue of the *Gazette*, there is another method which I have just been acquainted with, viz., the administration of amidopyrin. By E. Merck's Annual Report for 1917-1921, just to hand, on page 23, under amidopyrin it is stated, "according to H. Mautner, this preparation can be used in latent malaria to provoke an attack. If a dose of 0.7 gm. per diem be given for eight consecutive days an attack will as a rule occur on the fourth or seventh day. There is at present no explanation offered for this action."—Yours, etc.,

J. E. LEONARD, CHINAL,
M.D., D.T.M., L.M.

MONGHYR,
6th February 1926.

BETEL-CHEWERS' CANCER.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—As a rejoinder to the article which appeared in your issue for January, 1925, on the causation of betel-chewer's cancer, the following facts may perhaps be cited.

Buccal cancer is quite common among people who do not chew betel, so it is not safe to assume that the lime in the chewing mixture is the sole agent responsible. Even in methods of preparing and taking the chewing mixture there are variations in different parts of the country. In Malabar a quarter of a betel leaf, with a few grains of lime (*chunam*) smeared on it, and two or three fragments of areca nut forms the initial part of the "chew." After this mixture has been well chewed a piece of tobacco—some 2 to 6 drachms in amount—is then put into the mouth and kept with the original bolus in one corner of the mouth. Some will keep the "chew" in the mouth for only a few minutes, others for hours.

In the Tamil districts in South India, the "chew" differs considerably. Some take a dozen or two betel leaves with some two drachms of *chunam*, and insert the leaves one after another, smeared with *chunam*, into the mouth, which already contains about half an ounce of areca nut shavings; they do not usually use tobacco. Others use tobacco, but in very small quantities. In Malabar the addition of tobacco is universal amongst male members of all castes, and among all females—with the exception of Brahmins. In Tanjore and other Tamil districts both sexes of all castes, except Brahmins, add tobacco. Only a few Brahmin males however use tobacco.

On the Malabar side cancer is more common than in Tanjore and its adjacent Tamil districts. Buccal cancer is very rare among Brahmin ladies, though they chew more often and in more quantity than others. In Tanjore cancer is rarer among Brahmins of both sexes than amongst non-Brahmins.

Tobacco is a plant in universal and world-wide use. May it not have something to do with the incidence of buccal cancer? In clay-pipe smoker's cancer, may it not be the tobacco and not the pipe which is the cause? The irritant properties of *chunam* may have little or nothing to do with buccal cancer. Further, there is a custom in some parts of Southern India for people to insert a long piece of tobacco into the rectum to relieve constipation. A male patient recently consulted me who had cancer of the rectum; he gave a history of having frequently inserted a piece of tobacco some two inches in length into the rectum for the previous 15 years, in order to secure a daily evacuation of the bowels.

In brief, it seems to me that tobacco may be the element to be incriminated in the betel-chewer's mixture.—Yours, etc.,

M. A. KRISHNA IYER, L.M.P.

ALIPURAM JAIL, BELLARY.
8th January 1926.

A FORMULA FOR INTRAVENOUS IODINE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I read with much interest the notes on the treatment of pneumonia and of cellulitis in your issue for last December by my friend, Dr. S. N. Datta, L.M.P. I would like to mention, however that the following solution, which was advocated by Colonel Jeudwine in your issue for December 1923, appears to be less irritant and more useful than the use of the tincture:—

R Potassium iodide	..	..	36 grains.
Iodine, pure	..	..	24 grains.
Distilled water to	..	..	1 oz.

Dose; 1 to 2 c.c. diluted with 8 c.c. of distilled water. Each c.c. of the above solution contains one grain of iodine.

As a rule injections need not be given on alternate days; once a week is usually sufficient. I have tried

these injections with admirable results in cases of pneumonia, pleurisy, cellulitis, septic wounds, chronic bronchitis, carbuncle and rheumatism, and my notes on "The Treatment of Carbuncle by Intravenous Iodine" appeared in the *Indian Medical Journal* for September, 1925.

I tried the same treatment in two cases of phthisis, but the results were disappointing; both patients died.

I am indebted to my chief, Dr. E. A. Goldie, M.B., B.S. (Lond.), for useful suggestions in connection with this method of treatment.—Yours, etc.,

M. BAROOA, L.M.P.

DIBRUGARH, ASSAM,
8th January 1926.

Service Notes.**THE NEW DIRECTOR-GENERAL, INDIAN MEDICAL SERVICE.**

We have to congratulate Major-General T. H. Symons, C.S.I., O.B.E., K.H.S., I.M.S., formerly Surgeon-General with the Government of Madras, upon his appointment as Director-General, Indian Medical Service, with effect from the 1st April, 1926.—EDITOR, I.M.G.

APPOINTMENTS AND TRANSFERS.

The services of Lieutenant-Colonel T. H. Gloster, M.B., I.M.S., an officer of the Medical Research Department are placed at the disposal of the Government of Madras, with effect from the afternoon of the 28th January 1926, for appointment as officiating Director, Pasteur Institute, Coonoor.

Lieutenant-Colonel A. B. Fry, C.I.E., D.S.O., M.D., I.M.S., Professor of Hygiene, School of Tropical Medicine and Hygiene, Calcutta, is appointed to act as Principal, Medical College, Calcutta, in addition to his own duties, with effect from the 20th October 1925, *vice* Lieutenant-Colonel F. A. F. Barnardo, C.I.E., C.B.E., M.D., F.R.C.S.E., I.M.S., granted leave.

Lieutenant-Colonel N. M. Wilson, O.B.E., I.M.S., is appointed temporarily to officiate as Civil Surgeon, Simla West, with effect from the date on which he takes over charge from Lieutenant-Colonel Hallilay and until Lieutenant-Colonel Jeudwine's return from leave.

In modification of previous orders, Lieutenant-Colonel H. Hallilay, M.B., I.M.S., is appointed temporarily to officiate as Civil Surgeon, Simla (West), up to the 28th February 1926, or the date on which he is relieved by Lieutenant-Colonel Wilson.

Major H. Hingston, M.D., I.M.S., First Resident Surgeon, Presidency General Hospital, Calcutta, is appointed to act as Professor of Clinical Medicine, Medical College, Calcutta, and Second Physician, College Hospital, with effect from the 1st November 1925, *vice* Major J. D. Sandes, M.D., F.R.C.P.I., I.M.S.

Major J. D. Sandes, M.D., F.R.C.P.I., I.M.S., officiating Professor of Clinical Medicine, Medical College, Calcutta, and Second Physician, College Hospital, is appointed to act as Professor of Medicine of the said institution, and First Physician, Medical College Hospital, with effect from the 1st November 1925, *vice* Lieutenant-Colonel F. A. F. Barnardo, C.I.E., C.B.E., M.D., F.R.C.S.E., I.M.S., granted leave.

Major E. W. O'G. Kirwan, M.B., F.R.C.S.I., I.M.S., is appointed to act as Professor of Ophthalmic Surgery, Medical College, Calcutta, and Ophthalmic Surgeon, College Hospital, *vice* Lieutenant-Colonel W. V. Coppinger, D.S.O., I.M.S., going on leave.

Major S. S. Sokhey, I.M.S., is appointed temporarily to the Medical Research Department and posted as supernumerary officer at the Haffkine Institute, Bombay, with effect from the 18th August 1925. His services are placed at the disposal of the Government of Bombay for employment as officiating Assistant Director of the Institute, with effect from the date on which he assumes charge of the duties of the appointment.

APRIL, 1926.]

Major A. N. Dickson, I.M.S., an Agency Surgeon, is posted as Agency Surgeon in Bundelkhand, with effect from the 30th January 1926.

Major P. F. Gow, D.S.O., M.B., I.M.S., officiating Civil Surgeon, is transferred from Jalpaiguri to Murshidabad, vice Dr. Debendra Nath Hazra, transferred.

The services of Captain Haji M. Salamat-ullah, M.C., I.M.S., are placed temporarily at the disposal of the Government of the United Provinces, for employment in the Jail Department, with effect from the date on which he assumes charge of his duties.

The services of Captain B. G. Mallya, I.M.S., are placed permanently at the disposal of the Government of Bengal, with effect from the 19th October 1925, for employment in the Jail Department.

Captain R. Hay, I.M.S., an officiating Agency Surgeon, is posted as Medical Officer, Sistan Consulate, with effect from the 12th February 1926.

Subject to His Majesty's approval, the under-mentioned officer has been appointed permanently to the Indian Medical Service, as Lieutenant, by the Right Hon'ble the Secretary of State for India. His commission will bear the date 16th December 1925:—

Victor Alexander Edge.

LEAVE.

Major K. S. Thakur, I.M.S., Civil Surgeon, Bakarganj, is allowed combined leave out of India for ten months and seventeen days, with effect from the 25th January 1926, or from any subsequent date on which he may avail himself of the leave.

RELINQUISHMENT OF RANKS.

Major (now Lieutenant-Colonel) R. M. Carter, C.B., F.R.C.S., I.M.S., relinquishes the temporary rank of Lieutenant-Colonel on ceasing to be specially employed on 17th April 1919.

RETIREMENTS, ETC.

The King has approved the retirement of Lieutenant-Colonel R. M. Dalziel, M.B., F.R.C.S.E., I.M.S., with effect from the 29th January 1926.

The King has approved the transfer to the temporary non-effective list of Captain P. M. Antia, I.M.S., with effect from the 21st November 1925.

PROMOTIONS.

Major M. A. Coullie, I.M.S., whose retirement was notified in the *London Gazette*, dated the 16th October 1925, is granted the rank of Lieutenant-Colonel.

Captain N. M. Mehta, I.M.S., to be acting Major whilst holding an appointment with the Egyptian Expeditionary Force, from 22nd November 1918 to 24th December 1919.

NOTES.

TRYPARSAMIDE, MAY AND BAKER.

An interesting evidence of the increasing enterprise of British chemists is that Messrs. May and Baker of London have taken up the manufacture of tryparsamide, under licence from the Rockefeller Institute for Medical Research in New York. This interesting new arsenical compound is the sodium salt of N-phenyl-glycine-amide-p-arsonic acid, and is a white, colourless, crystalline, freely soluble powder. Introduced primarily for the treatment of sleeping-sickness in man, by the American workers, the drug has also a limited rôle of value in the treatment of meningo-vascular syphilis, general paresis, and tabes dorsalis, especially in the treatment of early cases of such conditions. In surra, reports are so far rather disappointing, but further investigation is called for; and it is in India especially that such investigation could be best carried out. Messrs. May and Baker publish a small brochure on tryparsamide, which may be of interest to both medical and veterinary workers in this country.

LEITZ'S MANUAL ON THE USE OF THE MICROTOME.

AN exceedingly valuable, instructive and well illustrated manual on the use of the microtome has been published by the well-known firm of Ernst Leitz of Wetzlar, a copy of which is given free to every purchaser of a Leitz microtome. The manual is the work of Dr. S. Becher, Professor of Zoology and Comparative Anatomy in the University of Giessen, and is now in its third edition. In 45 pp. the author fully explains the use of different types of microtome, the processes of section embedding, paraffin embedding, combined embedding, and the various cutting methods with different models, and the use of the freezing microtome. The brochure will be of great interest to all laboratory workers, and is a most handy and convenient one to consult. The English agents are Messrs. Ogilvy and Co., 20, Mortimer Street, London, W. 1.

REAGENTS CATALOGUE. THE GENERAL CHEMICAL CO., NEW YORK.

We have received from the General Chemical Co., 40, Rector Street, New York, a copy of their new catalogue No. 85 of chemical reagents. For two generations the firm of Baker and Adamson have been famous in America for their association with research and analytical work, and the "B and A." products of the General Chemical Co. are well-known. The present catalogue presents a list of some 950 products, alphabetically arranged. The analyses given shew that the utmost standard of purity of these reagents is insisted upon, and the catalogue is one which will greatly interest chemists, laboratory workers and research students. The prices given are F.O.B., but on p. 4 a list of package charges is also added; whilst every article has a code number assigned for use in cabling, and those which cannot be exported are marked with an asterisk.

THE "LABAT" OUTFIT FOR LOCAL AND SPINAL ANÆSTHESIA.

We have received from the Anglo-French Drug Co., Ltd. one of their "Labat" outfits for local and spinal anæsthesia.

A glass syringe is used in preference to an all-metal one, since it is absolutely necessary to control its contents at any stage of the procedure, especially when aspirating blood or cerebro-spinal fluid, when the needle has been introduced in the vicinity of large blood-vessels or close to the vertebral column, or within the sacral canal. Leakage of the plunger with a back flow of the anæsthetic fluid is noticed immediately, and the knowledge of the quantity of fluid injected is accurate, which is of some importance when the 1 or 2 per cent. solution is used.

The barrel of the syringe is, therefore, of transparent glass, which is more easily cleaned, but its plunger is metal. Both parts are ground to fit each other airtight. The barrel has a capacity of 12 c.c.; but the graduation at its distal end leaves a space of 2 c.c. behind the plunger, thus making aspiration possible as soon as the syringe is connected with the needle and before any fluid is injected. The barrel is closed by a

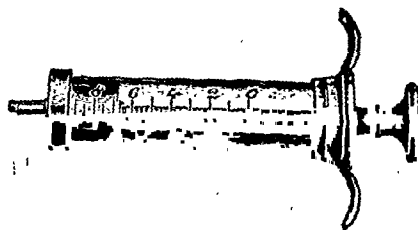


FIG. 1.

metallic cover screwed on to it and provided with suitable wings for a good and easy grasp during the manipulations (Fig. 1). Its distal end bears an eccentric

tip for adjusting the needle, and a bayonet lock which prevents the needle from flying off the syringe under pressure (Fig. 2). The eccentric position of the

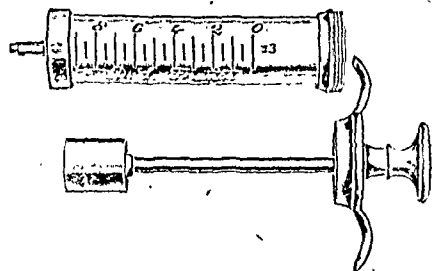


FIG. 2.

needle facilitates injection parallel with the surface of the skin and makes it easy to manipulate on very lean patients, especially in regions in which the prominences of the framework stand in the way. Screws for fixing the needle to the syringe are of no practical value, since the needle has very often to be introduced repeatedly apart from the syringe, Farr's pneumatic injector and self-filling syringes are contrivances which might be of some value for local infiltration; but these instruments do not suit the purpose of nerve blocking, since definite small quantities of fluid must be injected slowly in the close vicinity of each nerve to be blocked.

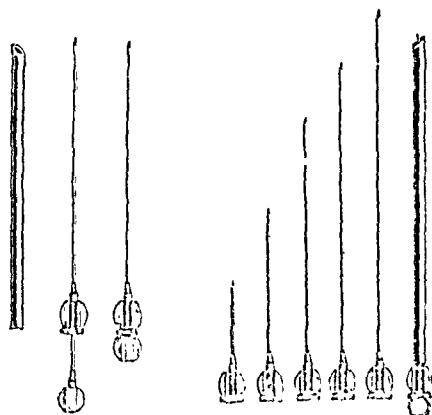


FIG. 3.

FIG. 4.

Needles.—The thinner the needle, the less the trauma to the tissues, blood-vessels or nerves; but the gauge of the needle should be suitable to its length and such as would delicately transmit to the fingers an expression of the nature of the tissues approached in the deep structures of the body. Regional anaesthesia needles should be flexible, but should not bend; they should be able to pass through all soft tissues with almost equal ease. They are, therefore, made of steel, highly polished or nickel plated, and have a long bevel with a very sharp point, so as to render their manipulation painless.

One set of needles is sufficient to meet the requirements of the various procedures for inducing regional anaesthesia. It is composed of:—

FIG. 3.

- The finest intradermal needles (No. 1)
- Two 50 mm. needles (No. 2).
- Two 80 mm. needles (No. 3).
- One 100 mm. needle (No. 4).
- One 120 mm. needle (No. 5).

FIG. 4.

Two spinal puncture needles.

Each needle is provided with a metallic shield to protect its point and a brass wire or stylet to prevent its obliteration.

The spinal puncture needle is made of nickel, and, being unbreakable, is preferred to the steel needle for

epidural or caudal block. The special bevel is of great value in puncturing the sacro-coccygeal membrane and advancing the needle up into the sacral canal. The length of the needle is 80 mm. and its thickness is 1.1 mm.

The outfit is very well made; it will be found suitable for taking blood for culture and for intravenous medication as well as for local anaesthesia and lumbar puncture.

MESSRS. E. MERCK'S ANNUAL REPORT FOR 1925.

We have received from Messrs. E. Merck, Chemical Works, Darmstadt, a copy of their annual report for 1925. It need hardly be said that this firm is one of world-wide reputation for the supply of purified and reliable chemicals and drugs, and this booklet of 492 pp. affords very interesting reading. Its general plan is to review the different preparations and drugs manufactured by the firm, in alphabetical order in the first 459 pages; and here the reader will find, not only a succinct and very readable account of each preparation or drug in question, but also a very complete bibliography. The publication covers all advances in pharmaceutical chemistry and therapeutics in the years 1917-1921, and it will be found to be of great interest not only to pharmacologists but also to the general practitioner. Further, the work is very fully indexed; there being a general index, as well as a special index of diseases, symptoms and indications for treatment. A third—bibliographical—index, of eight pages, shews how enormously wide a range of medical journals has been consulted in putting the work together. In brief this "annual" report is something very different from an annual report, it is a valuable guide to present-day therapeutics, fully referenced and very complete, put together with true German thoroughness.

No price is stated with regard to the report, which we presume is for circulation especially to medical practitioners and pharmacologists; but its value, both for the general practitioner and the experimental pharmacologist, is very great.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

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Original Articles.

SOME FACTORS AFFECTING THE PROPAGATION OF HOOKWORM INFECTIONS IN THE ASANSOL MINING SETTLEMENT, WITH SPECIAL REFERENCE TO THE PART PLAYED BY COCKROACHES IN MINES.

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(Contribution from the Hookworm Research Laboratory, Calcutta School of Tropical Medicine and Hygiene.)

IN connection with a field inquiry into the prevalence and epidemiology of hookworm infections in India, financed in part by a grant from the Indian Research Fund Association, an investigation was made of the factors influencing the propagation of the infection in the Asansol Mining Settlement of Western Bengal. Although the results of this investigation will be published in full in the *Indian Journal of Medical Research* at a later date, it seems advisable to call attention to some special points which were brought out and which have been particularly investigated. Special attention was paid to the distribution and fate of stools deposited on the surface of the ground and in the underground coal mines of the Settlement.

Surface infestation of the ground in the Asansol area is definitely limited to about five or six months of the year, from the middle of June to the end of November; during the rest of the year the dryness of the ground almost entirely does away with the probability of infection being acquired. In the winter months the temperatures are low enough to retard the development of the larvæ so that, in spite of occasional showers, the ground, which is gently rolling and from which surface water quickly runs off, probably very rarely remains moist long enough to permit the larvæ to reach the infective stage, except in very localised and exceptional situations, e.g., at the edge of a tank. In the pre-monsoon period from the beginning of March to the middle of June the sun is extremely hot and the ground becomes parched and baked in a very short time. There are fairly frequent showers in May and early June, and sometimes earlier in the year, but only exceptionally is there sufficient moisture at the surface of the ground on the sites selected as defæcation areas to allow hookworm larvæ to live for the five days necessary to reach the infective stage. There is very little deep shade in the area and the stools are deposited either on the surface of dry parched fields exposed to the full glare of the sun, or else in lightly shaded groves at the edges of the villages or *dhowras*. The Scarabæid beetles,

which are very active in mixing faeces with soil during the wet season, and thereby greatly assist the development of hookworm larvæ, bury themselves at a considerable distance below the surface of the ground during the dry season, and remain inactive until the ground again becomes moist. There was found to be an almost complete cessation of work on the part of these insects in February and March, when investigations were being made in Western Bengal. For these reasons hookworm infection in Western Bengal, among the agricultural people, is comparatively very low in spite of defæcation habits which are ideal for the propagation of the infection. No latrines of any type, or even bricks or logs for standing on during defæcation, are in use among the people in this part of Bengal. The stools are scattered over fairly extensive defæcation areas with no tendency to the use of natural standing places, beneath which the faeces accumulate in masses; such places are common in some parts of Bengal, and are not as favourable for hookworm development as the scattered pollution found near Asansol. In a village, Ratibati, in the Asansol Mining Settlement, which was carefully studied in February, although the incidence of infection was found to be 88.6 per cent., the average eggs per gram of faeces was only 421 and the index of infection 164. This indicates an average infection of about 18 worms per person. Tomb (1923), in his study of hookworm infection in this area, found an incidence of 43.32 per cent. among the low-caste village inhabitants by Lane's levitation method of diagnosis, which is less accurate than the newer D. C. F. method which we used. Tomb found an average of about nine worms per person among these village inhabitants, basing his estimate on worms recovered after anthelmintic treatment with thymol (60 gr.). There are several reasons why Tomb's estimate is lower than mine. It is never possible to expel all the worms by anthelmintic treatment; in a place where *Ancylostoma duodenale* constitutes about 30 per cent. and *Necator americanus* 70 per cent. of the worms harboured, as Tomb has shown to be the case in the Asansol area, 60 grs. of thymol cannot be expected to remove more than about 80 per cent. of the worms; there is further loss due to the elimination of worms later than 48 hours after treatment (Tomb does not say for how long the stools were saved after treatment; it is seldom possible even under hospital conditions to get Indians to save all the stools for more than a day), and finally a certain percentage of worms are lost by maceration or otherwise escape notice. One other factor also comes into play; Dr. Tomb's work extended over a considerable period of time, and it is very likely that many, possibly all, of his village

observations were made during the time of year when infection is low, whereas mine were made within a month after the season of maximum infection, which would be about six weeks after the drying up of the ground (about the beginning of January). There can be little doubt but that infection takes place freely during the five or six months of the year that the ground is moist, but since it has been shown by Chandler (1926) that in the absence of re-infections hookworm infections are reduced about 50 per cent. in three months and about 60 per cent. in six months, it is evident that at the beginning of each successive wet season the number of eggs reaching the ground, and which bring about soil infestation, must be relatively low; during the course of the wet season, as new worms are acquired and the infection increases, heavier and heavier infestation of the ground develops, but after this has gone on for five or six months the soil infestation is again destroyed by desiccation and re-infection is thus stopped. Instead of a cumulative increase in infection up to a high point of equilibrium, where the number of worms lost keeps pace with the number of worms acquired, such as occurs in many parts of the West Indies, where the rain is distributed throughout the year, there is a cumulative increase for only a few months, which is then brought back to a low point by a 60 per cent. decrease before conditions are again favourable, etc. It is significant that in spite of the fact that almost everywhere in India hookworm infections are light, wherever Indian labour has been transplanted to other countries where there is no protective dry season, e.g., West Indies, Fiji, Malaya, etc., intense infections develop in the very people who in their own country suffer very little.

In the underground coal mines environmental conditions are very different from the surface conditions, and are extremely favourable for the development of hookworm larvæ throughout the year. The temperature is moderately high at all seasons, ranging between 80° and 90° F., which is optimum for larval development and growth. The air is at all times near the saturation point as regards moisture, so that desiccation does not come into play at all. The defæcation areas usually selected are galleries running off from the main avenues of communication, where mining operations have been discontinued. Frequently galleries are selected near a stream where water for ablution can be obtained. The mine water was examined and found to be slightly alkaline (about pH 7.7) without any demonstrable quantities of the heavy poisonous metals in solution, and therefore not injurious to the development of the larvæ. At the edges of the streams the rock or coal floors, covered with coal dust and fragments of coal, are often kept moist by

spray from the flowing stream, or from water scooped up for ablution. In such places conditions for the development of hookworm larvæ are obviously nearly ideal. Some of these places were found to be very frequently used and fresh stools were always in evidence. More scattered pollution was also found in other galleries away from water, and even occasionally along the sides of the main avenues of communication, where there was frequently flowing water.

Particular investigations were made in a mine which Dr. Tomb has found to be rather more heavily infected than the average. An examination of 75 individuals living in the coolie lines of this mine, about equally distributed among males, females and children, however, showed that the infection among these people was actually *lower* than in the village group studied. The incidence of infection was 88 per cent., the average eggs per gram of fæces only 223, and the index of infection 128. This would indicate an average of only about ten worms per person as compared with an average of 28 found by Dr. Tomb among underground workers. However, many of these individuals undoubtedly did not work underground in the mines and were not exposed to mine infection. Since there was even less shade here than in the village studied and since the defæcation area was on a ridge from which the water would run off very quickly, a lower degree of infection than in the village would have been expected. In the mine itself, however, twelve fresh stool samples were collected and examined. Six of these were scattered stools, while six were taken from a much frequented disused gallery beside a water course. Of the first six, five were infected, the average eggs per gram was only 167, and the index of infection 101. Of the other six all were infected, the average eggs per gram was 1080, and the index of infection 325, which falls into the category of moderate instead of light infections. In spite of the small number of stools on which this difference is based, it seems to me it has some significance and is not the result of mere chance.

Observations were made on the fate of stools deposited in the mines. It has already been remarked that conditions were such as to prevent desiccation; there were no Scarabæid beetles or ants to carry away the fæces or to mix them with the substratum; and there were no domestic animals to devour them. Nevertheless it was evident that the stools were disappearing at a very rapid rate. For although fresh scattered stools could be found at any time, any traces of old stools were very difficult to find. Only in the defæcation area above mentioned where there was daily a considerable accumulation of fresh stools by the side of a stream was

there any evidence of old stools, and even here there were only small remnants of old stools to be found, consisting mainly of the larvæ and pupæ of a small *Fannia*-like fly, with very little actual fecal material but a considerable accumulation of fly droppings. Where stools had formerly been, a white deposit was found on the coal resembling a deposit of lime; the true nature of this was not determined. In order to find out how readily hookworm larvæ actually developed under the existing conditions, twelve fresh stools were marked so that the substratum could be subsequently collected to investigate the amount of infestation resulting. Each was covered with a flat piece of coal and marked with a numbered piece of paper on a stick of wood. When these sites were examined five days later I was surprised to find no evidence whatever of the stools; they had completely disappeared leaving no trace except a slight white deposit on the coal, as previously described. From the scrapings of the substratum only small numbers of larvæ, from none to at most 33, were obtained. The reason for the disappearance of the stools, however, now became apparent, for under each piece of coal were found numbers of large cockroaches (*Periplaneta americana*). These cockroaches were, in fact, found to be extremely numerous throughout the mines. Since there was practically no food for them except the human stools deposited in the mines, it is evident that they must make these their regular article of diet, and the rapid disappearance of the stools bears out the truth of this. In the much frequented defæcation area where some remains of old stools were found, it is evident that the accumulation of stools was so rapid that the roaches could barely keep pace with it. I have found in laboratory experiments that roaches prefer fresh to old feces, so unless the stools deposited on any one day were completely devoured before the next day, the remaining portion would be left in favour of the newly deposited supply. In the case of scattered stools these were usually devoured completely before a new supply was searched for. In consequence, very little, if any, hookworm infestation would develop on the sites of the scattered stools, while in the more frequently used places small portions of the stools would be left and the larvæ remaining in this part would be permitted to mature and cause ground infestation. I believe that this satisfactorily accounts for the relatively high degree of infection of the persons who deposited stools in such places, as remarked above.

It seemed important, however, to ascertain the fate of the helminth eggs devoured by roaches along with the feces. Probably a very high proportion of the roach droppings would be left in concealed or protected places,

or fall into crevices, where a foot would be unlikely to come in contact with them, but some would occasionally be left in places where effective infestation of the substratum would result in case the eggs were passed through the roaches in a viable condition.

To get information on this point some roaches were fed with feces containing large numbers of hookworm eggs, as well as a fair number of *Ascaris* and *Trichuris* eggs, and the droppings of the roaches subsequently collected and examined. Some of the droppings were allowed to fall on dry paper, and were collected at the end of 24 to 30 hours, while others were allowed to fall on moist blotting paper. After collection the droppings were soaked in water, made into an even suspension, and the eggs collected by Lane's D. C. F. method. Great numbers of eggs of an *Oxyuris*, nearly universally parasitic in the roaches used, were obtained in all cases. From the droppings which were collected from dry paper, and most of which had hardened and dried, a small number of hookworm eggs were recovered, but nearly all of them appeared dead or abnormal, probably from drying. From the droppings collected from moist blotting paper a small number of healthy-looking eggs were obtained. Small numbers of *Ascaris* and *Trichuris* eggs were obtained from each series. Some of the roach droppings, both dry and moist, were collected and placed on sand in a feces tin to allow the larvæ to develop. After seven days these cultures were set up for extraction of any contained hookworm larvæ by the Baermann apparatus, as modified by Cort et al. (1922). Two cultures made from about 2 mgms. each of dry or partially dry droppings yielded only two and four larvæ respectively. Another similar culture made from moist droppings from roaches fed on material containing very large numbers of concentrated hookworm eggs yielded 110 larvæ. It is evident from this that such larvæ as are passed out of the roaches with their droppings are perfectly healthy and develop readily in roach droppings on an otherwise sterile medium, but that only a small fraction of the eggs devoured are actually passed through.

To find out more accurately what happened to the hookworm eggs eaten by the roaches, a large number of eggs were collected by the D. C. F. method, recentrifuged in water, and mixed with some soft crushed banana. When a bit of this was smeared on a slide large numbers of eggs could be seen in every field under a microscope. This material was fed to some hungry roaches and was greedily devoured by them. Some of the roaches were killed and dissected a few minutes after they had eaten, and others about one and one half hours later. In both cases the crop was found distended with the crushed banana and the

hookworm eggs were apparently as numerous as before the material was devoured. Obviously the eggs were not destroyed by chewing. Up to one and one half hours after feeding none of the material had passed through the proventriculus and the intestine was practically empty. Next morning, about 18 hours later, the rest of the fed roaches were killed and dissected. The crops were now empty but the intestines were full, all the food having passed the proventriculus. The contents of the intestines were spread out on slides and carefully examined for hookworm eggs, but a prolonged search of the contents of six roaches revealed only about half a dozen eggs. It seems indisputable from this that only a few eggs succeed in passing through the proventriculus of the roach, the rest being broken and destroyed by the powerful chitinous grinding organs in the proventriculus.

One must conclude from this that, at least so far as the propagation of helminthic infections are concerned, cockroaches are very useful scavengers, and succeed in destroying the great majority of the worm eggs which they devour. Under conditions such as exist in the coal mines of Bengal they must play a very important part in controlling hookworm infection. As long as other food is withheld from them and the stools are not concentrated too much in one place, they must very largely keep the mines free from infection. In mines where rats and mice abound it would be advantageous to trap these animals in order to keep them from preying on the roaches.

CONCLUSIONS.

Surface infestation of the soil with hookworm larvæ is practically entirely stopped for about six months of the year, due to desiccation. In consequence of this break in the continuity of re-infections, hookworm infection is relatively very light in the agricultural villages of the Asansol Mining Settlement, since annually about 60 per cent. of the infection acquired during the favourable monsoon period is lost before re-infection begins again. This lessens the degree of soil infestation at the beginning of each successive favourable season, and thus the infection is kept down to a low level, in spite of defæcation habits which would otherwise favour a high degree of infection.

In the mines disused galleries, especially at the sides of streams, are used as defæcation sites. Conditions of temperature and humidity are highly favourable for the development of hookworm larvæ, but in spite of the fact that there is no desiccation, no activity of Scarabæid beetles, and no domestic animals to feed on the fæces, the stools rapidly disappear, being eaten up by cockroaches. It has been shown that when worm eggs in

fæces are eaten by roaches only a few pass through in viable condition, the rest being destroyed by the grinding organs in the proventriculus. Only where numerous stools are daily deposited in a small area are any traces of old stools to be found. Roaches, therefore, play an important part in the control of hookworm infection in mines, and should be encouraged by trapping rats and mice which prey on them. Only in stools collected in a much used place where the activity of the roaches could not keep pace with the deposition of fresh stools, was a relatively high number of hookworm eggs found. The average eggs per gram of fæces of these stools were over six times as great as in those found in scattered stools in the mine, and nearly five times as great as the average eggs per gram of 75 people living in the coolie lines on the surface.

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VARIATIONS IN THE POTENCY OF DIGITALIS PREPARATIONS IN THE TROPICS (II).

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In a paper published last year we pointed out that clinical observations as well as the biological and chemical assays of tinctures of digitalis show that they undergo deterioration rapidly in a warm climate such as that of India. We gave experimental and clinical data concerning a large number of tinctures, manufactured by reputed firms, which we had tested, showing that in a very short time they show a reduction of 20 to 40 per cent. in their strength. We also showed that tinctures freshly prepared from *Digitalis purpurea* leaf grown in Kashmir (Northern Himalayas) were quite active and showed at least the normal potency of a standard tincture (in some cases more) when tested by methods of biological assay as well as when tried clinically on patients. Unfortunately,

however, digitalis is not grown on any large scale in Kashmir, the specimens tested by us being grown purely for experimental purposes in a private garden. Digitalis leaf was grown in the Nilgiris at one time on a large scale but we have shown in a recent paper that its therapeutic activity as tested by laboratory methods is not great. It causes little or no slowing of the mammalian heart under experimental conditions, whilst the muscle poison effects overshadow the normal therapeutic effects when the preparations are injected intravenously. We have, however, suggested that this leaf should be given a thorough clinical trial before it is finally condemned. The muscle poison effects may not be produced when preparations made from it are given by the mouth.

Digitalis purpurea is also grown on a commercial scale in Mungpoo (Eastern Himalayas) and we have shown that, when assayed biologically, different specimens show marked variations in their activity. Some tinctures prepared from Mungpoo-grown leaf are quite active while the others are comparatively weaker. These variations, as we have pointed out, are probably due to the methods of drying and storing adopted there.

The outcome of all this is that the practitioner in this country does not know what is the strength of the preparation he is administering to his patients and is therefore faced with a great deal of uncertainty as regards the dosage he should employ and the therapeutic effects he may expect to obtain. Dr. S. C. Bose has stressed this point in his paper entitled "Clinical Studies on Digitalis in Bengal." After testing a large number of preparations on an extensive series of cases of heart failure in Calcutta he showed that none of the tinctures on the market could digitalize patients in doses of 5 to 8 drachms, as is the case in America and Europe. With most of the tinctures obtainable on the market in India massive doses of two drachms daily had to be given for 8 to 10 days before any conspicuous benefit was obtained. Dr. Bose communicated his own clinical results as well as those of biological assay obtained by us to Messrs. Parke Davis & Co., who have recently imported into this country a very powerful tincture whose strength is 50 per cent. greater than that of the ordinary tincture of digitalis of the United States Pharmacopœia. This tincture was formerly known as Digitalis Tincture No. III but has now been given the name of *Digifortis*. This preparation is free from fat, is sold in convenient one-ounce bottles and is further protected from oxidation by the use of carbon dioxide. The date of manufacture is put on each bottle and the manufacturers advise that it should not be used after twelve months after the date of manufacture. The dose advised by the

makers is 8 minims or 0.5 c.c. but we have given 30 minims or nearly 2 c.c., diluted with a little water, on an empty stomach without any discomfort to the patient or untoward effects.

Dr. Bose has tried this preparation in a fairly large number of cases of heart failure with and without auricular fibrillation and has had uniformly good results. Most of his cases could be got under digitalis effect with a total amount of 5 drachms in 5 days. Our own results on patients in the Carmichael Hospital for Tropical Diseases have been equally satisfactory.

As the existence of a good reliable preparation of digitalis is of great importance to medical practitioners in the tropics we have investigated the keeping properties of this tincture. Seven specimens of this preparation were kept at the laboratory temperature (60 to 100°F.) for periods ranging up to 20 months. These tinctures were then tested by a modification of Hatcher's cat method. The details of the results obtained are summarised in the table on p. 214.

DISCUSSION ON THE TABLE.

A perusal of the table will show that out of seven specimens of overstrength tincture of digitalis, five tinctures (Nos. 1, 2, 3, 5, and 6) kept their potency fairly well and produced reasonable slowing of the mammalian heart. Tincture No. 4, although prepared in October 1925 and assayed in March 1926, was toxic when given intravenously. It was dark greenish yellow in colour, showed a fine black sediment and did not produce any marked slowing of the heart. This may be due to defective sealing of the bottle. Specimen No. 7 was stored for nearly 20 months, i.e., 8 months over the time-limit fixed by the company after which the tincture should not be used; it showed very marked changes. This tincture on dilution was nearly black in colour, showed a large amount of precipitate and was toxic when administered intravenously for purposes of assay. To avoid confusion it may be pointed out here that tinctures which deteriorate and become toxic intravenously, do not produce any poisonous effect when administered by the mouth, though of course they produce little therapeutic action.

After examination of a large number of digitalis tinctures exposed to a warm climate, we have been able to evolve a rough but practical test to enable the practitioner to judge whether a particular preparation is likely to be active or not. Most of the good tinctures when diluted with nine parts of physiological saline or water have a light uniformly opalescent green or yellowish green colour. If on dilution the solution is blackish and contains fine black particles floating in it the probability is that the tincture has deteriorated. Some of these preparations on

Biological Assay of Overstrength Tinctures of Digitalis.
(Digifortis, Parke Davis & Co.)

No. of Tincture.	Physical characters of dilute solution (1 in 10).	Date of manufacture.	Date of Assay.	No. of c.c. equalling 1 c.c. of standard tincture.	Comparative potency with standard tincture, per cent.	REMARKS.
1.	Light greenish yellow, opalescent.	January 1925	15th February 1926.	0.7 c.c.	142.9	
2.	Ditto.	Ditto.	17th February 1926.	0.835 c.c.	120.4	
3.	Ditto.	Ditto.	18th February 1926.	0.667 c.c.	151.5	
4.	Dark greenish yellow with some fine black precipitate.	12th October 1925.	4th March 1926.	0.545 c.c.	183.4	Toxic intravenously, but no poisonous effect when given by the mouth.
5.	Greenish yellow, slightly opalescent.	16th June 1925.	8th March 1926.	0.725 c.c.	137.9	
6.	Yellowish green, opalescent.	Ditto.	23rd March 1926.	0.733 c.c.	137.0	
7.	Blackish fine particles.	4th August 1924.	24th and 25th March 1926.	0.438 c.c.	228.3	Toxic intravenously, but no poisonous effects when given by the mouth.

careful examination show a fine sediment settled at the bottom of the bottle.

It would appear from both experimental and clinical data which we have collected, that making allowance for the effect of the climate and the delay in use of the preparation in India after manufacture which must necessarily occur, there still remains adequate potency in this preparation and it would be possible for the patients to be digitalized with the usual doses of 4 to 6 drachms in 4 to 6 days with fresh specimens of this tincture, which is the aim of the practitioner. The importance of using only the samples which are within the stated period of twelve months is obvious from the assay of tincture No. 7.

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THE TREATMENT OF SYPHILIS BY BENZO-BISMUTH.

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DURING my three years' practice in Gulbarga District I have had occasion to employ several drugs in cases of syphilis, including the following, with varying success:—

- (1) Pulv. hydrarg. cum creta with Dover's powder orally.
- (2) Liquor hydrarg. perchloridi cum potass. iodidi orally.
- (3) The Anglo-French Drug Company's preparation "Mersalv" by inunction.
- (4) Triple iodide solution consisting of ammonii iodidi, iodide of mercury, and arsenic iodide by intravenous injections.
- (5) "Supsalvs" by rectal administration.
- (6) Neosalvarsan in varying doses, either by intravenous or intramuscular injections.
- (7) Sulfarsenol in graduated doses either by subcutaneous, intramuscular or intravenous injection.
- (8) Last of all "Benzo-Bismuth" (Anglo-French Drug Co.'s preparation) by injections, either subcutaneously or intramuscularly.

With increasing experience in the treatment of syphilis, I feel less and less inclined to administer mercurial preparations except in the form of triple iodide solution, 7 c.c. administered intravenously once a week, but the main disadvantage in using this drug is that it has got to be given always through the venous channel, and the slightest infiltration in the subcutaneous tissues is followed by excruciating pain with the result that the patient never returns for a further course of treatment. Moreover it has got a tendency to produce stomatitis of a severe type. "Mersalv" injections can only be relied upon when combined with a course of "Supsalvs" administered per rectum. Unfortunately, the price being prohibitive, this line of treatment is out of the question for hospital patients.

From among the arseno-benzol series I have found sulfarsenol to be a sovereign remedy in all stages of syphilis, especially when complicated with either gonorrhœa, leprosy, filariasis or malarial fevers; but even this medicine, so far as the poor class of patients is concerned, is beyond their reach, as each course of treatment costs not less than Rs. 20 or so.

Only recently I have had occasion to give a fair trial to a soluble organic salt of bismuth called "Benzo-Bismuth". The results obtained from its administration are extremely encouraging and nowadays I have been using it extensively among my patients with great success. The first case that I treated with this drug was one of secondary syphilis with a ring of condylomata around the anal orifice and a venereal wart on the lower lip. After receiving a course of 3 injections intramuscularly, within one week, the patient felt himself absolutely a different man; the condylomatous growth in the anal region subsided some 75 per cent. and the warty growth on the lip shrivelled up and was removed ultimately by ligaturing the pedicle, leaving a smooth surface flush with the mucous membrane.

The second case was that of an adult about 20 years old with a serpiginous ulcer involving the left ala nasi, of one month's duration, treated in a Taluka dispensary as a simple ulcer with antiseptic dressings. As soon as the patient was brought to my notice, the affection was diagnosed as one of venereal origin and the patient was given a series of Benzo-Bismuth injections both subcutaneously and intramuscularly. After a course of 5 injections (2 subcutaneous and 3 intramuscular), the ulcer completely healed up within three weeks and with the exception of a little deformity that was left on account of the margin of the left ala having been eroded, no trace of the disease was discernible.

The third case was that of an individual suffering from huge rupial eruptions all over the back, and big gummatous nodules on both

legs and ankles (with the left leg presenting an elephantoid appearance), and ulcers on both arms. This patient made a speedy recovery after receiving 5 injections within a fortnight.

The fourth case was that of a woman aged about 28 years, who came to the hospital with the whole of the left leg studded with innumerable sinuses, discharging foul stinking pus and full of maggots. There was also a gummatous node, about the size of a duck's egg on the middle of the right shin. The condition was of 6 months' duration. This woman also recovered very rapidly; the node completely disappeared and the foul septic condition on the left leg entirely dried up, leaving behind healthy scar tissue after the patient's receiving a course of 8 injections within one month.

Having run short of the stock I had no occasion to try this medicine on more cases, but the few cases that I have treated with highly satisfactory results justify me in advocating its use in purely syphilitic cases not complicated with either gonorrhœa or leprosy, in which latter class of cases the use of sulfarsenol is a *sine quâ non*.

With a view to bring about complete cure from a serological point of view, and in order to maintain complete immunity from the disease it would be best to follow carefully the directions given in the literature that accompanies each box containing five ampoules of the Benzo-Bismuth together with a similar number of ampoules containing sterilized neutral solvent. From my personal experience I find the main advantages of using this preparation to be:—

- (1) The small quantity that is injected, not exceeding 1.5 c.c.
- (2) The ease with which the drug is administered either intramuscularly or subcutaneously.
- (3) The painlessness after injection.
- (4) The uniformity of dosage.
- (5) The comparative cheapness.
- (6) No liability to toxic symptoms.
- (7) Complete solubility of the drug in a watery medium without leaving any particles in suspension.

EXTERNAL MEDICATION IN LEPROSY.

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LEPROSY is a disease which affects the skin more than any other part of the body. The corium is affected directly by the presence of lepra bacilli in its cells and intercellular spaces; and the epithelium is affected indirectly through the nerves and by reason of the

condition of the corium. It is natural, therefore, that we should expect benefit from external medication applied to the skin.

The visible lesions of leprosy may conveniently be divided into three classes, each class being typical of a particular stage of the disease.

(1) Lesions, one or more in number, spreading radially from the centres of infection. These generally show a raised, erythematous, spreading margin, raised in proportion to the grossness of the lesions; while the centre, beginning with a small umbilicated depression, is flatter than the margin, and shows, more or less, the characteristics of a scar. In dark skins such lesions are more or less depigmented in the central area and sometimes in a narrow circumferential band which spreads in advance of the erythematous margin.

(2) These spreading areas tend to coalesce and their spreading, erythematous margin tends to die down, so that large areas of tissue, which have more or less the nature of a scar, are left. This character of a scar is not always complete as the infection may spread from the more superficial layers of the corium, which are first affected, to the deeper layers. Nodulation may be superimposed on such lesions when conditions favour the multiplication of bacilli in them.

(3) The third is the glove-trophic type and is due to contraction of the newly-formed fibrous tissue around the axis-cylinders in the long nerve trunks, which leads to various trophic changes in the extremities, such as loss of sensation, wasting of the small muscles of the hands and feet, claw-hand, ulceration and shortening of the fingers and toes, perforated ulcers, etc.

Reference will be made later to these three different types of lesions in describing various methods of external medication.

Treatment in leprosy may, for convenience sake, be divided under three divisions:—(a) means which will cause improvement of the general health of the patient, (b) special remedies which may be given by the mouth or by injection, (c) external medication. The present paper will deal with the last of these.

It may be convenient to divide external medication under the following heads:—

1. Baths, which may be hot or cold, preferably hot followed by cold; they may be given as plain baths or baths containing such medicaments as soda, mustard, etc.

2. Friction accompanied by inunction. Both of these have for their object the flushing of the skin, the strengthening of the muscles and improvement of the general health of the body, while they probably tend to set free minute doses of toxins and produce a certain limited amount of immunity.

3. Caustics.

4. Surgical procedures.

I propose to limit the present paper to the consideration of the last two.

Caustics.—Many remedies have been used to cause that useful, though difficult to explain, condition called counter-irritation. Pure carbolic acid, carbon dioxide snow, various juices of plants and even the thermo-cautery have been used with a greater or less amount of benefit, while the natives of some of the South Sea Islands burn the skin around the lesions with a burning cigarette end; in fact, the number of counter-irritants which have been used is practically innumerable.

Recognising that there is a certain amount of benefit to be derived from counter-irritation, however it is brought about, we tested several different methods, and have found the most effective and the most easily controlled to be trichloroacetic acid dissolved in water. We apply it in three different strengths:—a 1 in 1 solution, which is applied to the centre of large thick nodules; for painting on the face it is convenient to use a 1 in 5 solution so as to avoid all danger of over-cauterisation; and a 1 in 3 solution, which is the most generally useful and may be painted on to any of the lesions of the first two types described above. Cotton-wool on a glass rod or a piece of bamboo is used as a brush, which is dipped in the solution and pressed against the sides of the bottle so that too much does not remain on the brush; the solution is painted rapidly over the lesion or lesions selected for application and allowed to dry. As drying takes place a slightly white appearance should be seen, as if the surface of the skin had been sprinkled with a white powder; if this does not appear on the drying of the solution, a second painting is required or even a third, but it is necessary to wait each time until the solution has dried. Care must be taken that either too strong a solution or too much of it (by having the brush too wet) is not applied to the wound, in which case the skin would appear uniformly white, as this may be followed by ulceration or by keloid formation. If the right amount of solution has been applied, the white, powdery appearance will give place, in a few hours, to black discoloration; and the black, burnt epithelium will separate in a few days, leaving a red surface which soon shows either hyperpigmentation, or depigmentation followed by hyperpigmentation.

This application may be repeated after 10 days. It is convenient, when injections are given twice a week or thrice in 10 days, to divide all the areas in the body requiring counter-irritation, into three parts, one part being painted on each injection day. The application of trichloroacetic acid causes a burning sensation for about two minutes; but

in spite of this, patients who have seen the results produced, insist on having it done.

The effects of the application of trichloroacetic acid are easily demonstrated by painting one side of the body—say of the face—while leaving the other side unpainted. This is shown in the photographs in a case in which lesions were equal on both sides to begin with (see Figs. 1, 2 and 3).



Fig. 1—Patient before treatment.



Fig. 2.—Side of face of same patient as Fig. 1, which has not been painted with caustic. Patient has undergone treatment by injections for a few weeks.



Fig. 3.—Other side of same face which has been painted with trichloroacetic acid repeatedly. The lesions were equal on both sides to begin with.

How the cauterisation acts it is difficult to say, but it seems to light up a local reaction which causes the formation of granular and resistant forms of the bacilli and also diminution in the numbers of or complete disappearance of the bacilli.

The great advantage of this form of application is that it can be absolutely regulated. More of the acid is required when the surface of the patient's skin is more alkaline or has more oil on it; but the powdered, white appearance described above is in every case a sure index to the amount of application required.

SURGICAL TREATMENT OF NODULES AND REDUNDANT SKIN.

(a) *Removal of early Nodules.* In cases in which there are only one or two nodules and no other marked lesions in the body, it is well to remove the nodule with the knife. This may generally be done with local anæsthesia. Even though the whole of the infection is not removed with the nodule, the plastic process set up by the operation causes entire disappearance of the lesion, only a scar being left; this is, of course, provided that the general resistance of the patient is good, otherwise such procedures have little chance of arresting the disease.

(b) *Trimming the Auricle of the Ear.* The nodular, pendulous, elephant-like ears of the advanced leper are well known; the disfigurement is very characteristic. But this condition can be improved very easily by a

simple surgical procedure. A curved clamp, such as that prepared for me by Messrs. Down Bros., (see illustration) may be used. It is applied to the auricle so that the part to be removed is external to the convexity of the clamp blade. If a shape slightly different from the curve of the clamp is required, this may be attained by pulling slightly upon the auricle before tightening up the clamp. Before applying the clamp, the ear should be cleansed and iodine applied. When the clamp has been carefully applied and tightened, the projecting skin is removed either with a pair of scissors or with a knife, and the raw surface is painted with pure carbolic acid. The clamp may be removed at once and dry cotton-wool applied; there is, as a rule, no bleeding and no bandage is necessary. Due to the deep analgesia of the part and deadening effect of the clamp, it is seldom necessary to use any anæsthetic, and patients seldom object to the procedure; indeed, when they have seen the results of it in other patients, they are generally anxious to have it done to themselves. Here, again, the benefit is not limited to the amount of redundant skin which has been removed; the plastic process causes progressive improvement for some days after the operation, and the whole appearance of the patient is often changed for the better, (see Figs. 4 to 8).

(c) *Surgical procedure in acute leprosy Neuritis.* There are few conditions more painful in leprosy than acute neuritis, which often accompanies a reaction during the course of the disease, especially when the patient has had his general resistance lowered by some intercurrent cause. We have tried electric treatment, ionisation and various internal



Fig. 4.—Ear before trimming.



Fig. 5.—Clamp applied and ear being trimmed.



Fig. 6.—After trimming and applying pure carbolic; clamp still applied.

medicines with only temporary relief; but, when the disease is confined to one nerve, as it very often is, a very simple surgical operation will remove the pain, cause considerable reduction in the swelling of the nerve and marked lessening of the anæsthesia and other nerve symptoms in the parts supplied by the nerve.

After applying local anæsthesia by infiltrating subcutaneously with $\frac{1}{2}$ per cent. eucaine or novocaine with a small quantity of adrenaline,



Figs. 7 & 8.—Effect of ear-trimming is seen by comparing two photographs.



Fig. 8.

an incision is made 3 or 4 inches in length over the affected nerve and the sheath is isolated from the surrounding tissue to the extent of

about two inches in front and one inch behind the nerve: (see Fig. 9). The wound

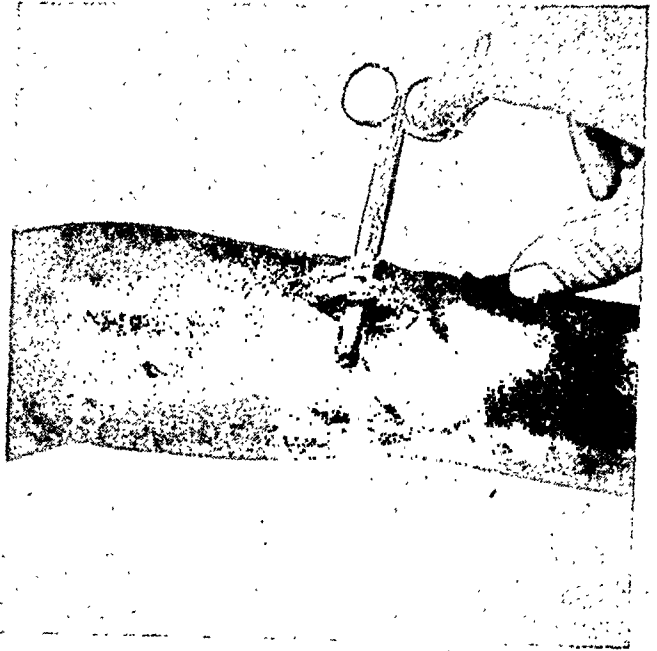


Fig. 9.—Scissors passed under thickened ulnar nerve.

is then sewn up and dressed. If the operation is done in the arm, which is the most common seat of this condition, the arm should be kept in a sling. The results of the operation are immediate cessation of the agonising pain, which the patient may have been suffering from for many days; reduction in the size of the nerve, which very often is $\frac{3}{4}$ inch in diameter; and restoration, to a certain extent, of the function of the nerve. When leprous infiltration of a nerve has gone on to form a nerve abscess, a condition which is not at all uncommon, similar relief is given as a rule by the opening and drainage of the abscess.

THE SEROLOGICAL ANALYSIS OF BLOODSTAINS IN CRIMINAL CASES. (ILLUSTRATIVE CASES.)

By

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IN this article it is proposed to describe some illustrative cases of bloodstains received in connexion with criminal trials, which have been analysed by serological methods in this department, shewing the results they have yielded. As is well known, until recent years the utmost that could be done analytically in a bloodstain case was to inform the Court that the bloodstain was or was not mammalian in origin. Apart from accidental factors it was never possible to determine that any given bloodstain was human. An interesting case in which an accidental factor did supply

the clue is reported by Bose (1) who in one case found embryos of *Filaria bancrofti* in a bloodstain, and as this is exclusively a human parasite this lucky chance enabled a positive identification of human blood to be made. Cases of this kind are naturally curiosities. Serological examination by means of specific precipitin antisera on the other hand enables precise identification of the origin of a bloodstain to be made in every case, given a stain not too minute and in reasonably good condition. These tests therefore provide information in legal cases which is not obtainable in any other way. The number of bloodstain analyses made in this department is very large, and during the last six years one has examined personally over 11,000 cases comprising an examination of some 35,000 articles from all parts of India and Burma. Over 90 per cent. of the bloodstains have been identified as to origin. In a small percentage the stains have undergone chemical changes due to the influence of water, chemicals, lime, &c., and in a few cases the stains are too intimately mixed with gross dirt or other foreign matter to permit of identification. In a few cases too, despite the amazing sensitiveness of the test—it can be carried out with one drop of a thousandfold dilution of blood—the stain is too small for identification. Over 80 per cent. of the bloodstain cases received are murder cases, and the majority of the bloodstains have been proved to be human. Nevertheless there are many interesting exceptions, and many false charges are thus brought to light. As will be seen from the cases which follow more than one kind of blood is frequently found in a stain. It is always a matter of considerable interest to discover how this has been effected. It is much to be desired that some exact method of determining the age of a bloodstain will be devised, for then we shall perhaps be in a position to determine which was the original stain and which was afterwards added. It is a remarkable fact that of those cases in which human blood is suspected, by far the largest number of non-human bloodstains—and therefore presumably of false charges—occur in charges of rape.

It may be of interest to note the type of articles which are received for analysis:—clothing of all kinds, knives, grass cutting choppers, sickles, earth, stones, leaves, twigs, pieces of wood and articles of jewellery are among the items most commonly received. The very large number of specimens of earth is especially noteworthy. This is natural as the population of India is largely rural. From Burma come powerful *dahs* and *dahshes*: swords from the Punjab and Rajputana: kukris from the hill districts. Buckets, lamps, coins, currency notes, water, firearms, bullets, books and papers are articles less frequently received.

The bloodstains may be large or small, fresh or old, sometimes highly stinking from decomposition, especially when packed wet during the monsoon season. The stains may be invisible to the naked eye, being concealed by rust, fruit juices, &c. In many instances attempts have obviously been made to conceal or destroy the stain by washing, burning or the addition of ink, paint, oil and the like. With the exception of certain chemicals which destroy the serum proteids, I know of no substance upon which a bloodstain cannot be identified as to origin; though special precautions are necessary in the case of leather and certain other articles.

In addition to bloodstains, other tissues of the body such as bones—if not too dry,—portions of muscle, skin, &c., can be identified as to human origin or not. Only very minute quantities of material are required: so small that the fragments of tissue could not possibly be identified by other means. The tests can therefore be applied to detect fraudulent sales of meat, e.g., horse meat for beef. They may also be utilised in the enforcement of game laws.

Serological tests can also be applied to the identification of proteid-containing secretions and excretions such as milk, semen and albuminous urine.

By serological tests we recognise the presence of proteid of a particular species: the method is not by itself a test for blood; and before serological tests are applied to blood solutions the presence of blood must be confirmed by any of the tests characteristic of hæmoglobin, of which microspectroscopy is by far the most suitable for bloodstains.

The following are some cases analysed in this department, classified according to the nature of the offence:—

Murder and Culpable Homicide Cases.

1. In a case from Madras Presidency miscellaneous articles and a dagger were forwarded for examination. Some of the articles were found to be stained with human blood, and many were found to be stained both with human blood and with the blood of a ruminant animal. The dagger, however, the weapon with which the offence was supposed to have been committed, was found to be stained with bovine blood alone.

2. In a murder case some earth, a piece of mat, and some straw were received from Bihar for examination as to human blood. The mat was found to be stained with the blood of a bird, while both the earth and straw were proved to be stained with the blood of a goat or sheep. Human blood was absent from all three items.

3. In a murder case three shirts and a handkerchief were received from Burma for examination as to human blood. The stains on all four articles were found to be due to

the blood of a ruminant animal, and human blood was absent.

4. In a case of dacoity (gang robbery) with murder some bloodstained earth was received from Madras Presidency. Fowl's blood was suspected. The stains on the earth were proved to be those of the blood of a bird (probably fowl).

5. In a case of attempted murder a knife was received from the Punjab for examination for human blood. The stains on the knife were found to be due to the blood of a sheep or goat and human blood was absent.

6. In a murder case from the Central Provinces a bloodstained stick was received for examination for human blood. The bloodstains were found to be due to bovine blood and human blood was absent.

7. In a murder case from the North West Frontier some bloodstained matting and sacking were received for examination as to the presence or not of human blood. It was suspected that mare's blood had been afterwards added to the sacking. The matting was found to be stained with non-mammalian blood, and the sacking was found to be stained both with horse's blood and with the blood of a ruminant animal, human blood being absent from both articles.

8. An axe was received in a murder case from the Central Provinces suspected to be stained with human blood. The blood present was proved to be bovine and human blood was absent.

9. An axe and two *dhoties* were received in a murder case from the Central Provinces. The axe and one *dhoti* were not bloodstained. The second *dhoti* was found to be stained with the blood of a bird (probably fowl) and human blood was absent.

10. Some earth and a cloth were received in a murder case from Madras Presidency. The earth was proved to be stained with human blood. The cloth, however, was proved to be stained with the blood of a ruminant animal.

11. Three specimens of earth and three specimens of leaves were received in a murder case in Bengal with a request for report as to whether the bloodstains thereon were caused by human or fish blood. One specimen of earth was not bloodstained. The remaining five specimens were stained with human blood.

12. In a case of murder a chopper and two axes were received from Bombay Presidency. One axe was proved to be stained with human blood. The chopper was stained with the blood of a ruminant animal. The second axe, however, was stained both with human blood and with the blood of a ruminant animal.

13. In a murder case a large number of articles were forwarded for analysis of the bloodstains thereon. All the articles were found to be stained with human blood. One

of these articles was a bullet on the base of which bloodstains were present which were proved to be human. The point of the bullet was depressed to form a cup: within the small cup was a minute fragment of hard substance which appeared to be bone. On removing this, a portion free from blood was obtained; and it yielded sufficient extract to permit of its identification as human by serum tests. The fragment was identified by the Government Pathologist as bone. The proof that the fragment was human bone was important evidence in the case.

14. A shirt and some wood shavings were received in a murder case from Burma for report as to whether the bloodstains were human. The stains on the shirt were proved to be due to the blood of a ruminant animal, while those on the shavings were non-mammalian blood; human blood being absent from both.

15. In a murder case a knife and billhook were forwarded from Madras Presidency for identification of the bloodstains thereon. Both these articles were proved to be stained with the blood of a ruminant animal, and human blood was absent.

16. In a murder case a knife and fourteen articles of clothing were received from Madras Presidency. The articles of clothing were all proved to be stained with human blood. The knife, however, the weapon with which the murder was supposed to have been committed, was found to be stained with non-mammalian blood.

17. Bloodstained cuttings from a shirt were forwarded in a murder case for report as to whether the blood was human or from a goat. The stains were proved to be due to the blood of a sheep or goat and human blood was absent.

18. Some sacking, a shirt, some string, earth, a spade, and some rags were received in a murder case. The rags were found to be stained both with human blood and with the blood of a sheep or goat. The remaining five items were stained with human blood alone.

19. A bloodstained stone was received in a murder case. The blood was proved to be bovine and human blood was absent.

20. Some earth and leaves were received in a murder case from Bihar. Both items were found to be stained with the blood of a ruminant animal, and human blood was absent.

21. A cloth and two specimens of earth were received in a murder case from Bihar. One specimen of earth was found to be stained with human blood. The cloth and the second specimen of earth were, however, found to be stained with non-mammalian blood.

22. In a murder case a sheet and three shirts were received from the Punjab. One of the shirts was found to be stained with

the blood of a ruminant animal. The remaining three garments were stained both with human blood and with the blood of a ruminant animal.

23. Four pieces of bone were received in a murder case from the Punjab for identification by serum tests as to whether they were human or not. All four pieces of bone were proved by serum tests to be human.

24. A rope and two specimens of earth were received in a murder case in Bengal. The rope and one specimen of earth were found to be stained with the blood of a bird, probably fowl, and human blood was absent. The second specimen of earth was stained with human blood alone.

25. In a murder case from Bihar some cloth cuttings, some straw and a knife were received for identification of the bloodstains thereon. The cloth cuttings and the straw were proved to be stained with human blood. The stains on the knife reacted negatively with antihuman serum. On making a microscopical preparation of these, the erythrocytes were seen to be of extremely small size. This suggested that the stains were those of the blood of a sheep or goat as the erythrocytes of these animals are approximately 4.5μ in diameter. The blood was afterwards proved by serum reactions to be that of a sheep or goat.

26. In a case of murder in Bihar two pieces of wood were forwarded for identification of the bloodstains thereon. The stains on one piece of wood were those of the blood of a fowl, while the stains on the other piece of wood were those of a ruminant animal. Human blood was absent from both.

27. In a murder case from Bihar an axe and a piece of wood were received for identification of the blood thereon. The axe was found to be stained both with the blood of a bird, probably fowl, and also with the blood of a ruminant animal. The stains on the wood were too much disintegrated for identification.

Rape Cases.

28. Some bloodstained cuttings from a *dhoti* were received in a rape case in Bengal. The bloodstains were found to be those of a bird, probably fowl, and human blood was absent.

29. Bloodstained cuttings from a woman's garment and other articles were forwarded in a rape case. From the large extent of the stains on the garment and the fact that they were chiefly on the outer side, it appeared unlikely that they were due to rape; and it was suspected by the sender that the blood was probably not human. The bloodstains however were all found to be human, and no other blood could be detected as present in addition.

30. A *sari* was received in a rape case from Bombay Presidency for identification of the

bloodstains thereon. The stains were proved to be due to the blood of a bird and human blood was absent.

31. A pair of bloodstained trousers was received from the United Provinces in a case of alleged rape for report as to whether the bloodstains—if found to be human—were menstrual or not. The stains on the trousers were found to be those of the blood of a ruminant animal, thus showing that the stains whether resulting from accident or design had not been caused by the act of rape.

32. Some rags were forwarded in a rape case from Burma for determination if the bloodstains were human. The bloodstains found thereon were proved to be due to the blood of a ruminant animal and human blood was absent.

33. Two portions of the same *dhoti* were forwarded by a Chemical Examiner in a rape case. One portion was bloodstained and the stains were proved to be due to human blood. The Chemical Examiner had detected semen in a second portion, and the seminal stains were proved by serum reactions to be human semen.

34. A *dhoti* was received in a rape case from the United Provinces. The bloodstains thereon were proved to be non-mammalian. From the microscopical appearances this blood was probably either fish or amphibian.

35. Trousers were received from the United Provinces in a rape case for report as to whether the blood, if human, was menstrual or not. The trousers were found to be stained with the blood of a ruminant animal.

36. Some bloodstained pieces of pyjama were received in a rape case from the North West Frontier Province. The blood was, however, found to be non-mammalian.

37. Two cloths were received in a rape case. One cloth was found to be stained with human blood. The other cloth was proved to be stained with the blood of a bird (probably fowl).

38. A bloodstained *sari* was received in a rape case in Bengal. The *sari* was proved to be stained both with human blood and with the blood of a ruminant animal.

39. In a rape case a woman's garment was forwarded by a Chemical Examiner, who had detected semen on it. Information was required as to whether the semen was human or not. The garment was proved by serum reactions to be stained with human semen.

Theft and House-Breaking Cases.

40. In a theft case a shirt was received from Burma for examination for goat's blood. The stains on the shirt were found to be due to human blood and goat's blood was absent.

41. In a theft case a *sari*, some earth and a towel were received from Bihar for examination for human or goat's blood. The stains on the towel and on the earth were proved to be due to goat's blood, and human blood was

absent. The stains on the *sari* were too small for identification.

42. In a theft case a *lungyi* and coat were forwarded for examination as to goat's blood. The stains on the *lungyi* were proved to be due to goat's blood, while those on the coat were found to be human blood.

43. In a case of causing hurt while committing robbery, a shirt and a pyjama were received from the North West Frontier for report as to the nature of the bloodstains thereon. The pyjama was found to be stained with the blood of a fowl. The shirt however was stained both with human blood and with the blood of a fowl.

44. A coat, a sheet, and a piece of rope were forwarded from the Punjab in a case of robbery for identification of the bloodstains thereon, which were suspected to be those of the blood of a sheep. The bloodstains on all three items were proved to be due to the blood of a sheep or goat.

45. A *dah* and a piece of bamboo were forwarded in a case of house-breaking for identification of the bloodstains thereon. The bamboo was found to be stained with human blood, while the *dah* was stained with non-mammalian blood. Embedded in the clot on the *dah* were fibres which were identified as fragments of the feathers of a bird. Presumably therefore the *dah* had been used to kill a bird, and the non-mammalian bloodstains and the feathers which were found together arose in this way.

Animal-Wounding Cases.

46. Some pieces of rope, a dagger, three axes, a piece of basket and two pieces of wood were received in a cow-killing case from an Indian State. One of the pieces of wood was found to be stained with the blood of a ruminant animal which could not be further differentiated. The remaining articles were found to be stained with bovine blood.

47. Some bloodstained earth was received from a Veterinary Assistant in the Bombay Presidency for report as to whether the bloodstains thereon were those of an ass. The bloodstains on the earth were proved to be of equine origin (horse, mule or ass).

48. In a case from the North West Frontier a sentry fired during the night at some object. The next morning bloodstains were found on the ground, and some bloodstained paper and dark powder were forwarded to this department by order of the Brigade Commander who desired to know if the bloodstains were human or not. The blood was proved to be of equine origin (horse, mule or ass).

49. In an animal-wounding case a cloth was received from the United Provinces suspected to be stained with horse's blood. The bloodstains on the cloth were proved to be of equine origin (horse, mule or ass).

50. In a case of animal-wounding which was tried by court martial, a bayonet, belt and two khaki coats were forwarded for examination as to the presence of mule's blood. The bloodstain on one of the khaki coats was too small for identification of its origin. On the remaining three items equine blood was detected (horse, mule or ass). This analytical result was important evidence in the case as it connected the blood found upon the prisoner's bayonets, &c., with wounds received by some Government mules.

51. In an animal-maiming case a mud pot was received for examination for sheep's blood. The stains found thereon were proved to be due to the blood of a sheep or goat.

52. In a cattle-maiming case from Bihar a knife and a cloth were received. The bloodstains on both articles were found to be due to bovine blood.

Miscellaneous Cases.

53. Some bloodstained earth was received in a case of defiling places of worship. The blood was suspected to be cow's blood. The bloodstains on the earth were proved to be bovine.

54. In an unnatural offence case a cloth cutting was forwarded from Sind. The bloodstains thereon were proved to be of non-mammalian origin.

55. A knife, some string and a cloth were received from the Punjab in an assault case. The knife and the string were proved to be stained with the blood of a ruminant animal. The cloth however was stained with human blood.

56. In a case of concealment of delivery a petticoat and cloth were received for identification of the bloodstains thereon. Both articles were proved to be stained with human blood. Subsequently other stained portions of the same two articles were forwarded by the Chemical Examiner for report as to whether stains of human milk were present. The Chemical Examiner reported that he had found fat and a reducing sugar in the stains from which he concluded that the stains were those of milk. Serum reactions proved that the stains were of human origin. The stains were therefore obviously those of human milk.

57. In an unnatural offence case bloodstained earth and cloth cuttings were received from Sind. The earth was found to be stained with human blood. The cloth cuttings however were found to be stained with the blood of a ruminant animal.

58. In a case of rioting two specimens of bloodstained earth were received for examination. The bloodstains were suspected to be either human or those of a rat. The stains on one specimen of earth were too much disintegrated for identification. The second specimen of earth was found to be stained

both with human blood and with the blood of a rat.

59. In a case of assault by means of an instrument used for shooting, two arrows were received for report as to whether the bloodstains thereon were human. The defence was that the bloodstains were those of a deer which had been killed in hunting. The blood was however proved to be human and deer's blood was absent.

60. In a case of alleged unnatural offence with a she-calf, a pyjama, two specimens of earth, some straw, and a leaf were received from the Central Provinces. The pyjama was found to be stained both with human blood and with the blood of a ruminant animal. The remaining four items were stained with ruminant blood alone.

61. Three specimens of earth, a cloth, a spade and a brick were forwarded for report as to whether the bloodstains were human blood or goat's blood. The brick was found to be stained with the blood of a sheep or goat. The spade was found to be stained both with human blood and with the blood of a sheep or goat; while the remaining four items were stained with human blood alone.

62. In a case from Bombay Presidency a *dhoti* and a *langoti* were received for examination for pig's blood. Both the articles were found to be stained both with pig's blood and with human blood.

63. In a case from Madras Presidency some skin with hair was received for identification. The tissue was proved by serological tests to be human.

64. In a case from Madras Presidency a bloodstained cloth was received with the information that bull's blood was suspected. The stains on the cloth were proved to be due to human blood and bull's blood was absent.

65. Some bloodstained rags were received in a case of sodomy. The father of the boy victim stated that he had used the rags to wipe the blood from the rectum of his son. The stains on the rags however were proved to be due to the blood of a bird.

66. In a case from Madras Presidency a cloth and two yokes were received. The stains on the cloth were too much disintegrated for identification. One of the yokes was stained with human blood, while the other was stained with the blood of a ruminant animal. The ruminant bloodstain on one of the yokes probably arose from the galling of the animal by the yoke. Ruminant bloodstains which have probably been caused in this way are frequently found.

67. A chopper was received on which human blood was detected. Firmly embedded in the bloodstain were hairs which were identified as human hair. The presence of human hair in a bloodstain strongly suggests that the bloodstain is human, but this is not

necessarily the case. Moreover the bloodstain may be derived from more than one kind of blood. Conversely, the finding of human blood suggests that the hair—which may be too dark in colour to identify microscopically—is human hair, but again this is not necessarily the case; though no doubt the finding of the hair of one species embedded in the clot of the blood of another species would be something of a curiosity. Loose hairs are of course of no evidential value as they may have fallen from anywhere.

68. A Civil Surgeon forwarded some dried meat for identification in connection with a suspected fraudulent sale of meat. The meat was found to be that of an equine animal, probably horse meat.

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SOME OBSERVATIONS ON THE BLOOD SUGAR AFTER TREATMENT WITH INSULIN IN DIABETES.

By LALMOHON GHOSHAL, I.M.S.,

Demonstrator of Physiology, Medical College, Calcutta.

IN cases of diabetes which are treated with insulin successfully the blood sugar comes down generally to 0.1 or 0.12 per cent. In some cases it has been noticed to come down to 0.06 per cent. This was in a case of diabetes which was treated in hospital; and even with such a low percentage of blood sugar there was found no alarming symptom whatsoever.

This naturally brought to my mind the question, what happens to the blood sugar? whether it is present in loose combination with the proteins or whether it is chemically combined with the proteins of the blood. Estimation of blood sugar by the Folin Wu method in the ordinary way brought about the same findings, so it is not in loose combination with the proteins. It must therefore be in chemical combination with the protein matter of the blood. I therefore tried to hydrolyse the blood with 5 per cent. HCl but with no result. Then I tried two per cent. H_2SO_4 to hydrolyse the blood sugar but unsuccessfully. This was probably due to the delicate nature of the carbohydrate combination and consequent metamorphosis into some other product by the strong acid. Finally I hit on the idea of hydrolysing the sugar by very weak acid.

I adopted the following method:—

1 c.c. of blood was taken and diluted with 7 c.c. of distilled water and then 1 c.c. added of 2/3 $NH_4 SO_4$, as used in the Folin Wu method to precipitate the proteins. I then put this product in a water-bath at $80^\circ C.$ for one hour.

Then the blood sugar was estimated; and to my astonishment the blood sugar was always found to increase. Thus when the blood sugar after a complete insulin course was 0.1 per cent. it was found by this method to be 0.2 per cent. This method generally succeeded only when there was no sugar in the urine and when the blood sugar was on a low level such as 0.1 per cent. or below it. Above this level this process did not succeed, neither did it succeed in normal cases nor in untreated cases. This puzzled me and I hit on the following idea. I thought that when hydrolysis with acids succeeds in some cases in bringing out the actual amount of sugar from the masked amount, digestion of the blood with pancreatin will certainly give a better result both in normal cases as well as in diabetic blood; so also in masked cases too.

Working on this idea I digested the blood with pancreatin and the results were uniformly found to be higher than as originally investigated by the Folin Wu method.

I adopted the following method:—

I took one c.c. of blood and diluted with 7 c.c. of distilled water; added 0.1 gm. of pure pancreatin (Merck's) and incubated for one hour. The sugar of the blood was then estimated by the Folin Wu method as usual. The results obtained from this method are as follows:—

Normal persons:—(taken from students' blood).

	Blood sugar by the Folin Wu method.	Blood sugar on digestion with pancreatin and by the Folin Wu method.
	per cent.	per cent.
1.	0.12	0.18
2	0.14	0.18
3	0.1	0.16
4	0.13	0.19
5	0.12	0.16
6	0.14	0.2
7	0.1	0.16
8	0.12	0.16

Thus we see that in every case there is increase in the blood sugar when the blood is digested with pancreatin. This also shows that the degree of blood sugar that we are accustomed to regard as normal is higher by this method. This has a very important bearing in diabetes, which we will consider later. In none of these cases was there sugar in the urine.

The blood sugar in cases of diabetes was also estimated by this method and the results were surprisingly high in every case.

The following table will show this:—

Case of diabetes	Blood sugar by the Folin Wu method.	Blood sugar on di- gestion with pan- creatin and by the Folin Wu method.
	per cent.	per cent.
1.	0.22	0.36
2.	0.26	0.36
3.	0.3	0.5
4.	0.22	0.34
5.	0.36	0.57
6.	0.32	0.4
7.	0.26	0.32
8.	0.18	0.3
9.	0.26	0.3
10.	0.36	0.4

These figures, although they have no relation to each other, have a very important bearing in one respect. It may be quite possible that diabetes is originally a disease of the blood and the disease is produced only when the blood proteins are unable to keep the sugar in chemical combination.

So many divergent views and theories have been advanced as regards diabetes that no common causation can be attributed to it; thus for example it is supposed to be caused by derangement of liver function; it has been supposed to be due to disease of the pancreas; some suppose it to be due to disturbance of internal secretion of the adrenals; others attribute it to derangement of the pituitary body whilst the thyroid is also thought to account for the causation of the disease. Hæmorrhage or injury to the medulla has been found to produce diabetes. Phloridzin is also reponsible for producing diabetes experimentally in animals. Long continued dyspepsia has been seen to finally develop into diabetes, particularly in cases of acid dyspepsia. Lastly, loss of the internal secretion of the pancreas has been taken by the modern world as the most important cause of diabetes, the final result of which is the discovery of insulin. Thus we see that there are many different causes attributed to the production of diabetes and hence the difficulty in getting to the root of the matter. Therefore if we find that the blood is the "organ" (if I may be permitted to say so) which is responsible for diabetes then the problem will be nearer solution.

From what we have seen we may conclude that when blood is capable of combining the sugar in such a way that it is powerful enough to hold it in chemical combination, diabetes will then never be produced. But if the blood is powerless to hold the sugar in such combination, owing to any of the causes mentioned above for diabetes, then only does the individual become subject to it. But the severity of the disease depends also on the combining power of the proteins with the sugar. Thus in the table given above those

cases were of severer type in which there was low blood sugar by the pancreatin method than those in which there was more blood sugar by the same method. It means that still more sugar was available for utilisation by the system.

Turning to cases which were treated with insulin, I observed only three such cases up to the end.

Case 1.—Simple diabetes. Course of treatment for three months and every day 20 units of insulin were given. The blood sugar came down to 0.1 per cent. from 0.3 per cent. by the Folin Wu test. When the blood was hydrolysed by $\frac{2}{3}$ NH_4SO_4 the blood sugar was found to be 0.2 per cent and when the same blood was treated with the pancreatin method the blood sugar was found to be 0.3 per cent. This means that the sugar was combined with the protein probably, and was not broken up by the ordinary method during estimation. This case is doing quite well and has not passed sugar in the urine yet, although nearly four months have elapsed since the time of the stoppage of insulin.

Case 2.—Diabetes with tuberculosis of the lungs. In this case, by treatment with insulin and diet regulation for two months the blood sugar was found to be 0.08 per cent. by the Folin Wu method; with the $\frac{2}{3}$ HN_4SO_4 method not much deviation was found; but with the pancreatin method the sugar content was found to be 0.14 per cent. In this case treatment with insulin did not help much in combining the sugar with the proteins and the result was that the patient gradually succumbed and died.

Case 3.—A case of diabetes with a big carbuncle in the back. His blood sugar was originally 0.26 per cent. by the Folin Wu method and with the pancreatin method it was only 0.34 per cent. After treatment with insulin, the blood sugar never dropped below 0.18 per cent. by the Folin Wu method and by the pancreatin method it was never above 0.22 per cent. I predicted it to be a very serious case and it was really so. The patient died 26 days after developing erysipelas. This means that he had lost all balance of the sugar combining power of the blood proteins and hence all energy to recuperate failed and therefore the case ended fatally.

From these observations I may venture to suggest that probably the power of insulin in diminishing the condition of acidosis is due to its sugar combining power, thereby preventing the breaking down of fats which is essentially the cause of the acidosis.

The subject requires careful research. Want of time and opportunity in obtaining cases has been a great drawback to me.

SUMMARY.

1. The blood sugar is higher than what we generally see by the Folin Wu method, when it is done by the pancreatin and Folin Wu method.

2. This excess of sugar is the combined sugar which is not easily breakable.

3. The severity of the disease, diabetes, depends on the amount of the combined sugar; the less the combined sugar, the more severe the case and *vice versa*.

4. Insulin treatment increases the combining power of the blood and thereby diminishes the sugar.

5. It is possible that in this way it prevents the breaking down of fat and thereby prevents acidosis.

A Mirror of Hospital Practice.

A CASE OF THE MENINGOCELE TYPE OF SPINA BIFIDA.

By P. SAVAGE, M.R.C.S., L.R.C.P.,

CAPTAIN, I.M.S.,

Resident Medical Officer, The Lawrence Royal Military School, Sanawar.

KALAVATI, a Hindu female infant, aged one year was brought to me for a fluid swelling in the lower cervical region.

History. The birth was said to have been normal, and the swelling at the back of the neck was noticed at birth. It was then the size of a walnut and had since been gradually enlarging.

On examination, the tumour was three and a half inches long in its vertical axis and sprang from the junction of the cervical and dorsal regions, in the middle line. It presented in appearance the shape and size of a mango with its apex hanging downwards. A few small dark hairs were seen on the skin at the upper attachment. For just less than half its surface the swelling was covered with normal integument. This was continuous with integument over the convexity of the tumour, which was thin and translucent and had numerous small dilated vessels coursing over it.

The accompanying photograph shows well the demarcation between the normal integument and the covering of the meningocele. On handling the tumour, it was obviously felt to contain fluid and on compressing the swelling, the tumour did not diminish in size, nor was there any increase in the pressure at the anterior fontanelle.

Although the infant cried vociferously during the whole examination, no impulse of any sort was perceptible to the hand. The tumour did not pulsate. On transillumination the tumour was uniformly translucent and no

dark patches were seen. The defect in the vertebral canal was made out clearly above and below the pedicle of the tumour.



in order to effect a more rapid cure, excision of the sac was advised.

Operation. Under chloroform anaesthesia, an elliptical incision was made on either side of the tumour, through the healthy skin near its base and an attempt made to dissect out the cystic tumour. Owing to its vascularity and its thickened walls and a desire not to prolong the anaesthesia in the infant, it was decided to terminate the operation as soon as possible. Defining the pedicle, which was a broad band of fibrous tissue (nearly an inch) springing from the gap between the vertebrae and apparently firmly united with the vertebral fascia, the sac was opened very cautiously. It contained no nervous elements and a probe would not enter the vertebral canal. The meningocele was apparently completely shut off. The pedicle was ligated in several places and the redundant tissue was snipped away. A small gauze wick was left in and the wound closed by suturing the adjacent margins of healthy skin.

Progress. On the tenth day after operation, when the stitches were to be removed, the child, who was previously going on quite well, suddenly became paralysed in all four limbs and expired in a few hours from respiratory paralysis due to compression of the cord. (oedematous meninges), in all probability the beginning of an acute septic meningitis.

"The meningocele type of spina bifida is not very common; the meningo-myelocele type is that most frequently seen in living children" (Rose and Carless). Holt (*Diseases of Infancy and Childhood*) gives a very clear description of the meningocele type which is worth quoting. "In this form there is a protrusion of membranes only. The accumulation of fluid is either in the arachnoid cavity or the sub-arachnoid space posterior to the cord. The opening of communication between the tumour and the spinal cord is very small in this variety, usually about one-twelfth to one inch in diameter. There may, however, be no communication. The skin is usually fully developed. The tumour is frequently globular, sometimes pedunculated, and may attain a very large size, being as much as five or six inches in diameter. This is because spontaneous rupture is not likely to occur and the tumour does not become infected except by operative interference. With such tumours patients live to adult life. This variety is most frequently seen in the cervical region. It has the best chance of natural recovery and in its operation gives the best results."

It is presumed that this meningocele, which was quite small at birth, became shut off from the central canal during the growth of the vertebrae and its lining membrane was excited to secrete fluid by persistent irritation, owing to its exposed position on the back of the neck.

The child herself was normal for her age, except that she was rachitic, probably due to her being still a breast fed infant. The head was nineteen inches in circumference and dolichocephalic in shape rather than hydrocephalic. The anterior fontanelle, which did not bulge, was still patent and larger than usual, while the two frontal bones were widely separated in the line of the sagittal suture, so that a deep furrow, easily admitting the tip of the index finger, could be clearly felt between the bones. Except for the gap at the base of the tumour, the remainder of the vertebral canal was normal and the child had no trophic disturbances or paralysis in the limbs.

The conclusion was, that the swelling was a pure meningocele and shut off from the thecal canal. There was no hesitation, therefore, in puncturing the tumour at its lower pole with a five c.c. syringe, and 2½ ounces of a clear fluid, like distilled water, was drawn off. The characteristics of this fluid are given below. The sac was very thick and vascular. Before withdrawing the needle of the syringe about half an ounce of Morton's fluid was injected. The somewhat shrivelled sac was then firmly compressed and pressure maintained with adhesive plaster.

A week later, in spite of the strapping, the tumour had partially filled up with fluid and

The fluid withdrawn from the meningocele was a clear fluid like distilled water; acid in reaction; specific gravity, 1008; albumen, nil; sugar, nil, (Benedict's test). Microscopically it showed no cellular contents.

I am very much indebted to the Rev. G. D. Barne, M.A., C.I.E., for the excellent photograph reproduced.

YAWS IN THE CHIN HILLS.

By D. D. GULATI, I.M.P.,
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Chin Hills, Burma.

In the issue of the *Indian Medical Gazette* for June 1925, Assistant Surgeon P. Bell, I.M.D., gives an account of yaws as it occurs in the Chin Hills of Burma. May I be allowed to give a brief description of the disease as it occurs in the Haka sub-division of that district? Incidentally I may mention that Dr. Bell is wrong in stating that cases of yaws were treated as being cases of syphilis prior to his arrival in this district; yaws had been known to be prevalent in this district for some years prior to his arrival, and I have myself treated cases of yaws in this sub-division years before Dr. Bell arrived. The disease is more prevalent in this sub-division than in any other in the district, as far as I am aware. I am unfortunately not a pathologist and I have not isolated *Treponema pertenue* from the cases, but the clinical signs and symptoms exhibited by these cases are those of yaws and not of syphilis.

In addition to Dr. Bell's description, I would draw attention to the following clinical points:—

(1) The primary sore may be present upon the angles of the mouth, the anus, or other parts, it has the appearance of a split pea. Fungoid condylomatous growths are common in some cases, especially at the anus. The primary sore may also occur on the finger tips, palms, breasts and at the junction of the scrotum with the penis. The tongue and fauces are not uncommon sites for the primary lesion in suckling infants whose mothers are already infected.

(2) Secondary infections. Of 25 cases treated, 8 were treated in the secondary stage with secondary lesions. After from two to five months from the initial lesion papular and nodular lesions appear scattered irregularly over the limbs and trunk, many of which become chronic. In some cases the primary sore heals completely without any treatment before the secondary lesions come out, but leaving a discoloured scar behind it; in other cases it is still persistent at the secondary stage.

The symptoms are never as severe as those of syphilis. In a few cases the secondary lesions affect the mucous membranes of the mouth and fauces, sometimes even that of the tongue.

The following two cases may be cited as typical:—

Case 1.—Chin male, aged 40. On admission he shewed a condylomatous ulcer of the anus, an indurated ulcer of the scrotum, and chronic scattered lesions—nodules—over the chest, forearms, axillæ and thighs. The duration of the disease had been two years. The primary sore, he stated, had appeared on the right groin and had spontaneously healed without treatment in two months. Three months later a papule appeared at the anus which had given rise to the condylomatous ulcer. He was cured after three injections of novarsenobillon, together with mercury treatment.

Case 2.—A Chin male adult of 40 years, with four children, was admitted for pain in all his joints and bones, of six months' duration. He shewed scattered nodular and papular eruptions all over the body, especially on the arms, axillæ, the palms of the hands and the groins. On the palms some of the lesions had ulcerated. The genitalia were entirely free from lesions. The patient stated that the primary sore had appeared in the axilla and had healed without treatment, leaving a discoloured mark. This patient belongs to Haka village and I have had him under close observation for nearly two years. He was cured by three injections of novarsenobillon and has since shewn no evidence of recurrence of the disease.

Further, his unmarried daughter, aged 18, had an indurated, raised ulcer on the upper lip below the nose. A son, aged 12, had a sore on the prepuce—simulating a soft and not a hard chancre,—a condyloma on the anus, and a warty growth at the angles of the mouth. A second son, aged 6, had lesions on the prepuce, with phimosis, warty growths on the anus and ulceration of the fauces. The mother of these children had ulcers on both breasts, whilst her suckling child, aged two years, had ulcers on its tongue and fauces.

From this description it is fully evident that the disease which we are here dealing with is yaws and not syphilis. Neither father nor mother in this family shewed any lesions upon the genitalia.

In the Haka sub-division the disease appears to run in families. It usually begins in children of some six years or more of age, who act as carriers from house to house; the whole village subsequently becoming infected. The disease is most prevalent in certain tracts, chiefly, Laitet, Wunthu, Keban and Yepai. The Chins are a very dirty race of people, and they tend to disregard infection with yaws.

Their local name for it in the Chin vernacular is "kozeing-mah," which means "celestial sore," and they consider that it is due to the visit of the celestial *nats*, who alone can cure the disease. In general, they are so loth to resort to hospital that many cases are only seen when in the tertiary stage, and some succumb to the disease. I am glad to state, however, that recently the Chins are coming forward voluntarily, and in large numbers, for treatment.

A CASE OF FATAL POISONING BY NITROBENZENE.

By D. R. THOMAS,

CAPTAIN, I.M.S.,

Chemical Examiner, Punjab.

A MAN aged 65 was suffering from habitual constipation and called at a chemist's shop on his way home from work at about 4 p.m. He asked for some almond oil for his complaint. Almond oil, or the oil of sweet almonds, is a common remedy in India for constipation. The old man after obtaining the medicine made his way to a milk vendor, bought a cup of milk, poured some of the medicine into it and drank the mixture. This was at about 5-30 P.M. At about 6 P.M., on arrival at his house, he complained that he was ill and was losing control of his muscles. He could not walk upstairs. He told his son that he had begun to feel ill after drinking the medicine. A doctor was sent for and arrived at 6-15 P.M. and found the patient with a weak and intermittent pulse, rapid respiration, anxious look, and inability to speak. The abdomen was tympanitic and there was incontinence of urine. Spiritus ammoniac aromatici was administered which was vomited. At 6-45 P.M. another doctor arrived who noticed that the vomit was smelling strongly of bitter almonds. In spite of stimulants, strychnine and artificial respiration, the patient gradually became more and more deeply cyanosed and lost consciousness and ultimately died at 3-30 P.M., the following day, 22 hours after taking the oil given to him by the chemist.

A 2-oz. phial found in the patient's pocket was three-quarters full and smelt of bitter almonds. The phial was a plain one and labelled almond oil.

The case was reported to the police as one of suspicious poisoning and a post-mortem examination and a Chemical-Examiner's report was ordered. The post-mortem report was as follows:—

The stomach contained about 10 ozs. of dark-brown fluid smelling strongly of almonds. The mucous membrane was thickened and hardened and there were petechial hemorrhages on the lesser curvature.

The intestine was healthy; the large intestine was loaded with faeces.

Bladder, normal and empty.

Lungs.—Slight congestion with signs of a previous attack of pneumonia which was subsequently verified.

The liver, kidneys, spleen and the brain showed no pathological changes.

The Civil Surgeon forwarded to the Chemical Examiner the following viscera together with a copy of his post-mortem report:—

- (1). A bottle containing the stomach and contents.
- (2). A bottle containing portions of small and large intestines.
- (3). A bottle containing pieces of liver, spleen and kidney.
- (4). A bottle containing a sample of spirit.

The police forwarded to the Chemical Examiner (a) a bottle labelled "almond oil" found on the deceased; and (b) a bottle said to contain almond oil, produced by the chemist who had supplied the medicine originally.

From a study of the case as thus recorded, I suspected prussic acid poisoning, and at once applied the preliminary tests of suspending a drop of silver nitrate solution on a watch-glass over the mouths of the bottles forwarded to me by the police. The results were negative. The contents of the four bottles received from the Civil Surgeon were then examined. The distillates from the first two bottles containing stomach and large intestines (bottles 1 and 2) gave the smell of bitter almonds. But, on proceeding with the chemical tests for cyanides, no reactions were given. This was at first rather puzzling and a possibility of the volatilisation or decomposition of the cyanides owing to the extreme hot weather was considered. The examination of the two bottles sent by the police was then proceeded with further. Both were supposed to contain almond oil. Bottle B., produced by the suspected chemist, proved to contain oil of sweet almonds, but the contents of bottle A., found on the deceased, did not give similar reactions and was evidently not the oil of sweet almonds.

A reference to the text books on toxicology and chemistry, showed that there are four compounds which have a somewhat similar or comparable smell:—

- (1). Oil of sweet almonds.
- (2). Oil of bitter almonds.
- (3). Artificial oil of bitter almonds, (benzaldehyde).
- (4). Imitation oil of bitter almonds or oil of mirbane, (nitrobenzene).

The last two are synthetic products of which (4) the imitation oil of bitter almonds, (nitrobenzene) is poisonous. Nitrobenzene is the mono-nitro-compound of benzene and can be prepared by the action of nitric acid on benzene. It is a pale yellow liquid with a strong smell resembling that of the oil of bitter almonds. It is used in commerce in the manufacture of furniture polish, boot polish and in perfumery. Symptoms of poisoning have occurred from its external use. Internally fifteen drops have proved fatal. Its price is less than half that of good almond oil.

The phial found on the deceased contained a liquid oily substance resembling nitrobenzene and the following tests were applied:—

Test I.—The substance on reduction with zinc and hydrochloric acid produced aniline. The aniline boiled with caustic potash with the addition of a few drops of chloroform gave the characteristic extremely unpleasant smell of phenyl-isocyanide (carbamine).

This test was positive for all the distillates obtained from the viscera, most marked in the distillates from the stomach and intestines and faint in the distillates from the liver, spleen and kidney. The test was negative for the preservative spirit.

Test II.—The substance, on treatment with manganese dioxide and sulphuric acid on the water-bath retained its smell of bitter almonds. The same result was obtained by this test on the distillates from the viscera, i.e., the smell did not disappear.

It was evident therefore that bottle A. found on the deceased contained nitrobenzene, of which presumably about half an ounce had been taken with milk. I reported that nitrobenzene was found in all the organs sent for analysis as well as in the small phial found on the deceased. No poison was found in the sample of spirit.

The almond oil obtained from the suspected chemist's shop (bottle B) proved to be oil of sweet almonds.

On this report the case came up for trial, but was finally dismissed on the following grounds:—

(1). Although a label bearing a certain chemist's name was on the bottle, some of the smaller shops in the bazar possess no labels of their own and so they retain the original label placed on the bottles.

(2). No nitrobenzene was found in the shop of the suspected chemist (search was made some days later).

I have reported this case for two reasons:—

(1). Its toxicological interest. I believe it is the first case reported in the Punjab and possibly in India.

(2). The importance of providing qualified dispensing chemists. At present there is nothing to restrict any one starting a dispensing shop or from selling poisons. The amount of bad dispensing all over India is only too evident, and I would venture to suggest that the cases of accidental poisoning occurring are more numerous than one might care to believe.

It may be noted that the test for aniline was positive only after the nitrobenzene had been reduced by nascent hydrogen. This shows that nitrobenzene is very stable in decomposed viscera.

Nitrobenzene appears to have a direct action on the blood, upsetting its oxygen-carrying capacity. Some toxicologists have described the nitrobenzene haemoglobin spectrum. I was not able to identify the spectrum. This may have been due to the condition of the blood (which was chocolate in colour and decomposed) during the hot weather when the case was examined.

A CASE OF SYPHILIS OF THE LIVER SUGGESTING LIVER ABSCESS.

By VALLABHDAS N. MEHTA, I.M. & S.,
Pirangam.

SUCH cases being by no means uncommon, the following may be of interest to the readers of the journal.

Mr. M., aged about 40, in robust health before his illness, had been suffering from fever with rigors and pain in the hepatic region. This continued for a period of about 2 to 3 months, with occasional remissions of fever and pain. Lately, he began to have paroxysms of shivering with fever and this was followed by profuse sweating. He complained of very severe pain in the whole hepatic region and the whole area below the costal margin was very tender to the touch, so much so that even very light palpation was extremely painful. He was unable to lie on his back or on his left side. Even while trying to sit he had great dyspnoea, and it was with great difficulty that he could be made to sit up even for a few minutes. He was much emaciated and he was very anæmic. Before consulting me, he was treated for malaria and hepatitis for about three months, and he had received about one dozen injections each of quinine bihydrochloride and emetine at different intervals.

Examination of blood films failed to show any evidence of malaria. The leucocyte count which ranged from 7000 to 9000 showed only 16 per cent. mononuclears and 76 per cent. polynuclears.

The upper margin of hepatic dullness was somewhat irregular and as the liver was obviously enlarged it was thought there might be a hepatic abscess.

While closely questioning the patient about his past history and whether he had suffered from any venereal infection, he confessed he had a small sore, which as he said, was immediately cured by three intravenous injections of neo-salvarsan.

Before puncturing the liver for confirming the diagnosis of abscess, I thought it fit to put him on antisyphilitic treatment for a few days, and strange as it may seem, there was very marked and rapid improvement from the third day. In about a week's time the patient felt very much better, and in about a fortnight's time he was well on the way to recovery. Fever and pain entirely disappeared after the third day of treatment.

The possibility of a syphilitic infection of the liver may well be borne in mind while treating such cases, where the symptoms often simulate those of malaria or of amoebic liver abscess.

INTRAVENOUS IODINE IN A CASE OF ABORTION COMPLICATED WITH SEPTICÆMIA.

By B. J. BOUCHÉ, I.M.D.,
Assistant Surgeon, Jullundur.

AN Anglo-Indian lady was admitted to the Station Hospital, Kasauli, on the 24th December 1925.

History of Present Illness.—She was 14 weeks pregnant, and on the 22nd December had developed fever, 101°F., with pain in the uterus and adnexa and a slight "show." On the 23rd the temperature rose to 102.4°F., after which a

Every time the patient got fever his blood was examined microscopically and it was found to contain plenty of malignant tertian rings and a few crescents. Even in the intervals of attacks of fever he was getting quinine sulphate 10 grs. twice a day throughout and occasional doses of calomel. In spite of so much quinine by the mouth he used to get relapses frequently until the administration of intravenous quinine which gave him permanent cure.

I am grateful to Dr. V. J. Lopez, I.M.D., our Medical Officer, for permission to publish the above notes.

RETENTION OF URINE DUE TO AN IMPERFORATE HYMEN.

By M. NASIRUDDIN,

Acting Civil Surgeon, Nanded, Hyderabad, Deccan.

MARIAM BEE, a Mohamedan girl, 18 years of age, a resident of Nanded, was brought by her father to the Civil Hospital complaining of retention of urine on the 17th October 1925 at about 9 a.m.

On enquiry she stated that she had not passed urine for four days, complained of pain in the lower part of the abdomen and back, and fever for a fortnight. She had been in bed since then on account of inability to stand and walk freely. She gave a history of complete amenorrhœa. On admission she was put to bed and examined. She was lean, weak and anæmic. Her breasts were fairly developed. There was a soft fluctuating pyriform swelling about the size of a coconut in the middle of the lower part of the abdomen, extending up to the umbilicus. On auscultation no foetal heart or uterine sounds were heard, so pregnancy was excluded. On examining the external genitalia I found a soft cyst-like tumour about the size of a small orange protruding outside the vulva, the central portion of which presented a bluish-coloured area. The urinary meatus was not visible.

On making a digital examination, I could not find the vagina as the outlet of the par-turient canal was completely blocked by the protruding mass. Thus I was certain that it could not be a prolapse of the bladder or the anterior vaginal wall. I then tried to push the tumour inside to expose the urethral orifice and succeeded in passing a catheter with great difficulty. I drew out about 8 ozs. of urine. Though the abdominal swelling was slightly diminished, yet the soft swelling protruding outside the vulva remained just the same.

After the evacuation of the bladder she was given a warm soap enema, even then the swelling never disappeared. In the evening again a catheter had to be passed to relieve the distended bladder. On further examination no other general disease was detected, except a

rise of temperature to 101.5°F. On enquiry her father admitted that the girl had not menstruated even though she was 18 years of age.

A diagnosis of retained menses was made. The thick bluish-coloured layer in the centre of the prolapsed mass, which entirely obliterated the vaginal canal was a very thick imperforate hymen.

The patient was put on the table and anæsthetised the next day after an enema and catheterisation. I tapped the protruding tumour outside the vulva in the middle line with a trocar and cannula. About 2 pints of chocolate-coloured retained menstrual fluid came out, after which the swelling disappeared gradually. Then the puncture was enlarged with a blunt-pointed bistoury. The uterine and vaginal cavity was douched with warm Condyl's lotion and a drainage tube inserted into the vaginal canal. The patient was sent to bed after dressing.

She was kept on milk diet. The temperature and pulse became normal. Menstruation continued for three more days, after which the tube was removed. She could pass urine freely after this without any further retention.

She was discharged cured on 22nd October 1925.

AN UNUSUAL CASE OF NASAL POLYPUS.

By K. J. SHIVDASANI, I.M.S., B.M.S.,

Medical Officer, Shikarpur.

D.M. a Mohamedan male, aged about 45 years, was admitted for treatment of a tumour in the nose. The tumour was of about three years' duration and had been slowly but steadily increasing in size.

On examination the right side of the nose was considerably distended into an almost globular shape. The external orifice on that side was circular in shape and a little bigger than a silver four-anna piece. The left side was not deformed in shape externally. The right nasal cavity was occupied by a tumour which obliterated the whole cavity and extended into the posterior nares. The septum was pressed into the left cavity, touching the external wall and blocking the passage on that side also. Externally the tumour was flush with the edges of the anterior nares, the four-anna sized surface which was exposed being dry and the rest moist and covered with mucous membrane. The tumour felt hard and fleshy. It extended posteriorly into the pharynx where it was hanging behind the soft palate and uvula like a ball. The last two structures were thinned out and pushed considerably forward. The tumour appeared to grow from the lateral wall of the nose, being non-adherent on other

sides. It was not freely movable inside, being more or less jammed in the cavity.

The patient presented a funny appearance with a large globular nose and open mouth and spoke with a nasal tone; he had considerable difficulty in swallowing and some in breathing which he did through the mouth.

The patient was chloroformed and though he felt suffocated and breathed with difficulty he was got under. The tumour was found attached to the lateral wall for an area about the size of half a rupee. It was freed from its attachment with the knife. At this stage the patient stopped breathing and his pulse also stopped. The pulsation of the aorta, which was clearly visible through the thin abdominal wall, also ceased. An injection of 10 minims of liquor strychnine was given hypodermically, the head of the patient was thrown over the end of the table and artificial respiration started. After an anxious minute or two he started breathing and the aorta throbbed violently. No more chloroform was given, but with two fingers passed behind the soft palate, the tumour was hooked and an attempt made to pull out the polypus via the mouth, as the inner end of the tumour was too big to be pushed forwards through the anterior naris. With the pull the tumour broke into two at its central narrow part or isthmus, and the posterior ball-like half came away through the mouth. An attempt to pull out the rest of the tumour through the anterior nares with gland forceps failed as the tumour was friable. A further attempt to push the tumour forwards with a finger in the posterior naris also failed as the external orifice was too small for the big tumour to pass through.

The side of the nose was therefore slit with a pair of scissors to the extent of an inch and the tumour forcibly pushed forwards with the finger in the posterior naris and delivered intact. There was smart bleeding which was controlled by artery forceps and the cavity was tightly packed with sterile gauze moistened with adrenalin chloride solution. The slit side of the nose was sutured.

All this time the patient remained unconscious though no more chloroform was administered after he had stopped breathing and his head was kept hanging over the end of the table.

The tumour weighed nearly 8 ozs. after treatment. The plugging was removed after two days, when the patient felt very queer with such a roomy nasal cavity. He had regurgitation of fluids through the operated side for a few days, as the posterior naris was too wide to be completely shut off by the soft palate during deglutition. His nasal tone did not disappear immediately, but gradually improved. His recovery otherwise was uneventful. The man was seen again two months later when his nose had taken its

natural shape, the nasal tone had nearly disappeared and he had no trouble of any kind.

Interesting points in the case are the large size of the tumour, its friable nature, its origin from the lateral wall, and the fortitude with which the patient put up with the trouble for such a long time. He sought relief only when the difficulty in swallowing and breathing was becoming severe.

A CASE OF ABNORMAL SALIVARY FISTULA.

By GOPAL SINGH CHAWLA, M.B., B.S.,
Temple Road, Lahore.

A YOUNG Hindu lady of about 23 years of age consulted me for the flow of a limpid fluid from behind the left ear whenever she took food. This complaint had lasted for some 13 years.

On examination I found a tiny fistula, with its orifice about half an inch behind the left ear. On enlarging and deepening the orifice nothing abnormal could be detected, but the wound did not heal under antiseptic dressings.

On asking her to make the same movements with her jaw as if chewing food, no fluid escaped from the fistula; but the moment that food was chewed, fluid commenced to run out of the fistula. The case appears to be clearly one of abnormal salivary fistula; though I regret that I was unable to have the fluid analysed, as its amount was too scanty.

A CASE OF FOREIGN BODY IN THE ABDOMINAL CAVITY.

By K. NARAYANAN, L.M.P.,
Local Fund Hospital, Pultur, S. Kanara.

The patient, an unmarried female, aged 22 years, was admitted to hospital on the 19th January 1926, with abdominal pain and fever of 20 days' duration.

Examination shewed a pyriform swelling, some 3" long and 2" broad, situated between the right anterior superior iliac spine and the umbilicus. It was adherent to the abdominal wall, signs of inflammation were absent over it, but it was indurated and tender on palpation. The uterus could not be palpated easily and there was some rigidity of the right rectus muscle. Vaginal examination shewed nothing except a very foul sero-purulent discharge. The case was diagnosed as one of chronic appendicitis, and prepared for operation the next day.

Operation. An incision was made 3½" in length to the outer side of the right rectus muscle, and on deepening the incision through the subcutaneous fat, hard fibrous tissue was encountered, whilst pus escaped through a small sinus in the tissue. A director was introduced into the abscess cavity, and on introducing the finger and exploring, a hard

iron-like band was felt. On following this to its tip, the end struck upon the finger as if it were a sharp needle.

This suggested a foreign body. The tip of the hard band was seized with pressure forceps, and the foreign body delivered through the wound. It proved to be a wooden stick some 6" in length and 1/10th of an inch in diameter. After its removal pus escaped through the wound, which was next thoroughly well swabbed out, packed with sterile gauze, and allowed to heal by granulation.

The patient made an uneventful recovery, and was discharged cured on the 18th February 1926. She refused to give any history as to how the foreign body came to be there; but it had presumably been inserted *per vaginam* for purposes of procuring abortion.

My thanks are due to Capt. U. Ananthya, M.B., C.M., my medical officer, for permission to publish the notes of this case.

A CASE OF ACCIDENTAL ABDOMINAL INJURY.

By Capt. C. C. DAS GUPTA, M.B.,

Chief Medical Officer, Hossainabad Group of Tea Estates, P. O. Gopal Bagan, Jalpaiguri.

On the 8th April 1924, a coolie boy, aged 10 years, was brought to the Ram Jhora Hospital with a wound about two inches long below the umbilicus, from which some portion of the small intestine was protruding.

While playing, he fell on a piece of broken glass and sustained the above injury.

The boy came to the hospital on foot supporting the coil of intestine in a piece of dirty cloth.

The gut was replaced under chloroform and the wound was stitched, leaving a gauze drain. The parents took the boy away to their hut a few hours later against advice.

The wound healed by first intention and there was no complication.

The case is similar to the one published by Dr. Joglekar in the *Indian Medical Gazette* for November 1925.

A CASE OF DEATH DUE TO BISMUTH INJECTION.

By C. F. CHENOY, M.B., B.S., D.P.H. (Lond.)

District Civil Surgeon and Sanitary Officer, Raichur.

THE following case ending in death within two hours after injection of bismuth is worthy of record.

One night at 8-45 P.M., I was called in to see a Hindu patient. The history given was

that the patient was given an intramuscular injection into the buttock by a doctor at 7 P.M. The condition of the patient reported was that he was unconscious. On further enquiry I was told that after receiving the injection the patient began complaining of thoracic pain and cramps in both legs. He began to have palpitation. This was followed by perspiration and suffocation. The medical attendant was called. The doctor came over and could not make out the trouble and left the patient, advising the relations to send for the Civil Surgeon. On hearing this, the patient tried to get up, but could not do so as he was paralysed.

On examination the patient was unconscious. Dyspnoea was markedly present, the pulse was weak and rapid, as also the respiration. The face was pale, pupils contracted, and perspiration abundant. The heart sounds were weak. Coarse râles were heard in the chest but the percussion gave a clear note. Both his legs were paralysed. In this condition death took place in my presence within an interval of ten minutes after my arrival and within two hours after the injection. The injection tube which was shown was one of "Neo-Trepol".

The cause of death was due to the injection of "bismuth" being inadvertently given into the vein of the gluteal region. Bismuth is ten times as toxic when injected intravenously as when given subcutaneously and the preparation injected being insoluble the mechanical effect from blocking of the veins was well marked.

AN UNUSUAL CASE OF PNEUMONIA IN AN INFANT.

By Capt. C. C. DAS GUPTA, M.B.,

Chief Medical Officer, Hossainabad Group of Tea Estates, P. O., Gopal Bagan, Jalpaiguri.

ON the 31st December 1925, I was called to a case of lobar pneumonia in a child 3 months old. The baby had been suffering from slight cough for four days, but as there was no rise of temperature the parents took no notice.

On examination, the base of the left lung was found to be consolidated. The patient was dyspnoeic and extremely cyanosed. The temperature was 97°F. Next morning the base of the right lung was found affected and he expired at noon.

The special feature of the case lies in the fact that the temperature never rose above 98°F. The explanation seems to be that the thermogenic centre was so overwhelmed by the toxins that there was no reactionary fever.

Indian Medical Gazette.

MAY.

TUBERCULOSIS.

COMPARATIVELY little work has been done on tuberculosis in India in spite of the fact that the disease is one of the great causes of death in this country. We might excuse the neglect of the study of tuberculosis by suggesting that the malady is cosmopolitan and therefore we need only keep in touch with the research work which is being carried out in other countries. This, unfortunately, is an assumption which is quite unjustifiable, for the reason that tuberculosis in India is by no means the same as tuberculosis in Europe, and it is necessary for us to face the undoubted fact that tuberculosis as it occurs in India and the tropics generally must be regarded as one of our tropical diseases. It is likely, for example, that bovine tuberculosis is an uncommon disease in India, it is likely that comparatively few children in India become immunized against the disease by suffering from the mild attacks of gland tuberculosis which are so common in Europe.

It is a matter of common knowledge that tuberculosis of the lung in India usually runs a much more rapid course than the disease in Europe, and although this may to some extent be due to the lower resisting powers of the people of this country, it is also likely that the absence of the immunity which results from mild forms of the disease in childhood plays an important part.

If India enjoys the advantage of escaping from bovine infection through milk, she also suffers from a corresponding drawback for the reason that bovine infections in childhood probably serve to confer a valuable degree of immunity against infection from human sources.

If we bear in mind the probability that our tuberculosis problem is by no means identical with that of European countries, we can derive much useful knowledge of the disease by studying the work which is being done in Europe.

A valuable contribution to the subject has been made by writers in the *Tuberculosis Number of the Edinburgh Medical Journal*, (March 1926). Drs. W. D. Munro and W. M. Cumming write an instructive article on the virulence of tuberculous viruses. Starting from the observed fact that small doses of bovine tubercle bacilli are deadly to the ox and rabbit, while similar doses of human bacilli are of low virulence to these animals, they have examined a large number of strains of bacilli from human cases of tuberculosis. They find that in pulmonary tuberculosis

nearly all the strains are of the human type at all ages, in the cervical gland infection of adults nearly all are also human, while the cervical gland tuberculosis of young children is more frequently due to bovine bacilli.

Bone and joint tuberculosis is nearly always due to the human type of bacillus, while abdominal tuberculosis in young children is rather more frequently of bovine origin (13 to 9), although in adults it is usually caused by the human type (14 to 4). They suggest that the bovine strain may possibly become modified in the human body so that it gradually assumes the characters of the human strain, and in support of this view they point to the existence of a few strains which are intermediate in character between the bovine and the human. Sir Robert Philip and Dr. J. C. Simpson deal with the production of "certified milk" and show to what a degree of perfection methods of dairy farming have attained in some places.

The cattle are tubercle free as shown by the tuberculin test, they are housed in well lighted and well ventilated sheds which are kept scrupulously clean. The cows are carefully groomed; before milking, the hands of the milkers are cleansed as for a surgical operation; the udders of the cows are carefully washed, the dairy utensils, overalls of the milkers, etc., are sterilized by steam. The first milk is rejected, a special pail is used with a lateral opening which prevents dirt or hair from falling into the milk. The milk is cooled to 50°F. and bottled in sterilized bottles which are sealed and capped, the milk is not touched by hand at any time. The milk which is obtained in this way contains less than 1,200 bacteria per c.c. after 24 hours, and all the bacteria are of the lactic group; these being normally present in the cow's udder. Dr. L. Findlay contributes an article on the incidence of tuberculosis in childhood, from which it appears that all forms of medical tuberculosis are far more common in the first three years of life than in later years, the curve falling rapidly till about the 10th year.

He points out that tuberculosis of the lungs in childhood is an acute or subacute disease which is almost always rapidly fatal, evidence of healed pulmonary tuberculosis in young children is very rarely found in the post-mortem room.

He also shows that pulmonary tuberculosis in young children is nearly always a diffuse disease of which the only physical signs may be wheezing râles with slight diminution of resonance all over the lungs.

The x-ray picture is that of widely diffused discrete shadows which usually show the "snow-storm" appearance. Localized shadows either at the apex or base rarely indicate tuberculosis, and the so-called hilum shadows can usually be disregarded.

Acute miliary tuberculosis cannot be diagnosed by an x-ray picture. He often obtains sputum from young children by swabbing the throat with a finger covered with gauze, in this way coughing is induced and the sputum can be collected with the gauze for examination.

The Von-Pirquet test was found to be of very little value as so many children give a positive result from old healed tuberculosis of the glands.

It is to be hoped that a systematic study of tuberculosis in India will be taken up, preferably in the first instance at all events by men who have an intimate knowledge of research work in tuberculosis in European countries. We must confess that our knowledge of the disease in India is based for the most part on general clinical observations, and even these have not been made under such conditions as to permit of accurate analysis. What we do know, only too well, is that tuberculosis in India is a very widespread disease which under existing conditions is exceedingly difficult to control. We have also good reason to believe that the prevalence of the disease is closely associated with low nutrition, with slums, and with grossly unhygienic habits of life. Special research into the disease will not merely be of great value in giving us more accurate knowledge of the disease, it will attract attention to the necessity for tackling the problem of prevention.

Most of the efforts of medical men in India are expended on the hopeless task of trying to cure the victims of the disease. What is needed is to attack the enemy in his stronghold, rather than to carry on a feeble guerilla warfare against his widespread roving bands, which in most cases have already gained victory before we are aware of their presence.

Current Topics.

All-India Conference of Medical Research Workers.

THE following is an abstract from the proceedings of this conference which was held at the Calcutta School of Tropical Medicine in December, 1925:—

First day (15th December, 1925).

Thirty-eight delegates from the various provinces and from the Army attended.

The Conference was opened by Major-General Sir R. C. MacWatt, Director-General, Indian Medical Service, who presided and delivered a short address on the present position of the Indian Research Fund Association and on the opportunity afforded by the partial restoration of the grant-in-aid for the undertaking of new and important researches. He also announced the fact that a tablet had been placed in the Central Research Laboratory, Kasauli, to the memory of the late Major Cragg, I.M.S.

The Conference proceeded to discuss the publication of the *Indian Journal of Medical Research*. Lieutenant-Colonel Graham explained the accounts of the *Journal* and the method of conducting the *Journal*.

Lieutenant-Colonel Christophers, the present Editor of the *Journal*, made a few remarks on the subject of

publication; the published matter was now very much increased and the memoirs that had been published during the year were of a very useful nature, some being in wide request. It was therefore a good way of broadcasting. The interleaving of the *Journal* with advertisements has been a financial success, but he himself would prefer to see these advertisements at the beginning and the end of the *Journal*. The discussion on this point became general. The policy of the Editorial and Secretarial staff was unanimously endorsed.

A statement which had been circulated showing the financial position of the Indian Research Fund Association during the years 1925-26 and 1926-27 was read and certain points in this statement were explained by the Secretary. The cash balance was much greater than was anticipated, partly on account of the original estimate of the Accountant-General being a provisional one and also because, in some cases, the total grant for certain researches had not been expended and the balance had been returned to the Fund. Contributions of the local Governments to the Kala-azar Commission had not been received in the cases of Bengal and Madras; but it seemed possible that in the former instance there had been an error and the grant would be renewed this year. The pay and allowances of eight officers holding unspecified appointments under the Indian Research Fund Association, which had hitherto been shown under 32—Medical [Budget, D. G., I.M.S.] was, by order of the Government of India, to be shown in future under 33—Public Health; hence provision for pay, leave pay, and pension contributions for these eight appointments was now included in this budget.

The research programme in operation during the year 1925-26 was then read. This programme included the researches taken up during the year as a result of the restoration of the Rs. 3 lakhs grant-in-aid.

The President then invited the research workers present to make a few remarks on their work as at present being undertaken. A brief resumé of these is appended under sub-heads (I) to (XLII).

(i) *Cinchona Alkaloids Inquiry*.—Major Acton made a few remarks on the nature of this inquiry; the main line of work had been experimental pharmacological investigation of the effect of the combination of alkalies and quinine and an investigation into the diffusibility of the various alkaloids.

(ii) *Quinine and Malaria Inquiry*.—Major Sinton gave a resumé of his work, a fuller report of which appeared in the January 1926 issue of the *Indian Journal of Medical Research*. He said that the quinine-plus-alkali treatment produced 90 per cent. of cures. One of the main difficulties was seeing that the patient actually got the quinine.

(iii) *Anti-plague Vaccine Inquiry*.—In the absence of Dr. Naidu, who was carrying out this investigation, Major Morison explained the lines on which the inquiry was being carried out; the method of preparation of plague vaccine had not been changed for 25 years, and, in view of the great advance during the last few years in vaccine therapy, it was thought that some improvement in the vaccine could be effected.

(iv) *Helminthic Inquiry*.—Dr. Korke explained that his work had been mainly a geographical survey of certain parasites.

(v) *Kala-azar Treatment Inquiry*.—Dr. Brahmachari explained that his investigation had been mainly directed to finding a more powerful antimony compound for the treatment of kala-azar and also one that could be used intramuscularly and orally.

(vi) *Kala-azar Commission*.—Lieutenant-Colonel Christophers said that at last year's Conference he had remarked that there were strong reasons for supposing that infection occurred by means of contamination as in the case of typhoid fever, and that the work of the Commission had been planned to investigate the possibility of infection occurring in this manner. The work at the Calcutta School of Tropical Medicine had shown that, not only were there strong epidemiological

reasons for suspecting the sandfly—*Phlebotomus argentipes*—but that the causative parasite actually developed with great rapidity in the gut of this fly. The Commission had felt justified in largely abandoning their original line of work which had given entirely negative results, and in following the lines suggested by the findings of the workers in Calcutta. The Commission had been able to confirm these findings and recently to carry the matter a step further and show that there was a heavy infection of the pharynx in certain infected sandflies.

Major Shortt, who had become the Director of the Commission since Lieutenant-Colonel Christophers had left it, said that by cutting sections of the sandflies he had been able to show massive infection of the buccal cavity on the 8th day after the infecting feed and, in a few flies, on the 5th day.

Lieutenant-Colonel Christophers described the mouth parts of the sandfly and said that in his opinion it was almost impossible for the flagellates not to infect the wound when a sandfly with an infected buccal cavity fed on a man.

(vii) *Kala-azar Inquiry at the Calcutta School of Tropical Medicine.*—Dr. Napier made a few remarks on the events which had led to their experiments with the sandfly—*Phlebotomus argentipes*—and explained that the work during the year had been mainly field work directed towards studying the bionomics of the fly in nature and under artificial conditions. Up to the end of August, 8,784 flies had been bred and the feeding experiments had been repeated at different times throughout the year; controls had been done with another sandfly, *Phlebotomus papatasi*; all the controls had been entirely negative. Dr. Smith added a few remarks about the Calcutta inquiry.

(viii) *Leprosy Inquiry by Dr. Muir.*—Dr. Muir said that he had been investigating the Wassermann reaction in leprosy with the help of Major Lloyd; they had come to the conclusion that the positive reaction was due to syphilis, and they had been able to show that when patients were treated for this condition their leprotic lesions improved very markedly. Investigations had shown that the hydnocarpus oil, when prepared from fresh seeds, was actually less painful for injection than the esters. It was much cheaper than the esters.

(ix) *Bovine Tuberculosis Inquiry.*—Dr. Soparkar explained that, though tuberculosis amongst cattle was supposed to be rare in India, his experience had been that it was fairly common; he had found between 2 and 3 per cent. infected in all the places that he had investigated. He said it was true that local lesions were the rule in this country; he had only rarely encountered lung lesions which in England occurred in 50 per cent. of infected cattle. He said that he was testing the resistance of various breeds of cattle and that contrary to expectations he had found cattle of mixed strains (partly English) more resistant to infection.

(x) *Sprue and Bilharziasis Inquiry at the Haffkine Institute, Bombay.*—Major Morison said that Dr. Hamilton Fairley had submitted a report of his work for publication in the *Indian Journal of Medical Research*. Lieutenant-Colonel Mackie was investigating the relationship between sprue and Monilia. Investigation into the bacteriology and chemistry of the stools in sprue was being undertaken; the main result so far was that a streptococcus had again fallen under suspicion.

(xi) *Indian Indigenous Drugs Inquiry.*—Major Chopra explained that two sets of investigations were being undertaken, the first was the investigation of the indigenous variety of drugs of known value in order to find out if their pharmacological standards were as good as those of the imported drugs. They had been able to show that digitalis grown in Darjeeling and santalin from Kashmir were as good as the imported varieties of the drugs. The second line of work was the investigation of the value of certain drugs used in the indigenous systems of medicine; some of these have

been found to have decidedly beneficial action in certain disease conditions.

(xii) *Lathyrism Inquiry by Major Anderson, I.M.S.*—Lieutenant-Colonel Christophers explained that, as Major Anderson was shortly proceeding on leave, the inquiry on the lines proposed would have to be closed down as nobody suitable was available to carry on the work; some results had already been published in the *Indian Journal of Medical Research* and others would follow.

(xiii) *The Indian Culicid Inquiry by Captain Barraud.*—Lieutenant-Colonel Christophers explained that Captain Barraud was continuing to direct this inquiry while he was working with the Kala-azar Commission in Assam; it was hoped that before very long he would be in a position to devote more of his time to the completion of this important inquiry.

(xiv) *The Antivenene Inquiry by Father Caius.*—Major Morison explained that various circumstances had prevented this work being undertaken and that the sum in question had not been drawn.

(xv) *Malaria Inquiry at Lahore by Major Hughes, I.M.S.*—Lieutenant-Colonel Graham explained that Major Hughes was carrying out a laboratory inquiry into the biochemical changes in the blood in malaria with special reference to quinine administration.

(xvi to xxv) *Military Inquiries:*—
Malaria Survey at Allahabad by Captain M. L. Dhavan, I.M.S.

Malaria Inquiry at Kohat by Captain A. C. Chatterji, I.M.S.

Ankylostomiasis Inquiry at Dehra Dun by Captain G. Covell, I.M.S.

Peshawar Sandfly Inquiry by Lieutenant-Colonel McCombie Young, I.M.S.

Heat Exhaustion and Heat Stroke Inquiry by Colonel F. H. G. Hutchinson, C.I.E., I.M.S.

Anæmia Inquiry at Bombay by Captain Basu, I.M.S.

Pyrexia Inquiry at Quetta by Director of Pathology, Baluchistan District.

Researches at the Poona District Laboratory by Major Manifold, R.A.M.C.

Researches at the Wellington District Laboratory by Major Dunbar, R.A.M.C.

Researches at the Calcutta District Laboratory by Captain Mearns, R.A.M.C.

On behalf of the Director of Medical Services in India, Lieutenant-Colonel Mackenzie thanked the President for sending an invitation to the Military Medical Services to attend this Conference and to take part in the research work. He explained that they had now got a trained pathologist at each of the district laboratories and that they had been able to undertake the ten above mentioned inquiries. The main insect-borne diseases with which the Army had to contend were malaria, sandfly fever and dengue; the sandfly inquiry had been completed, as also had an ankylostomiasis inquiry; Captain Chatterji at Kohat was testing various mosquito repelling substances; most of the other inquiries had only just commenced and he had little detailed information as to their progress.

(xxvi) *Malaria Classes at the Central Research Institute, Kasauli.*—These classes had had to be discontinued until this year. Major Sinton detailed the course given in May, 1925; lectures were given at Kasauli and the field work was carried out in the Terai near Ambala.

(xxvii) *The Preparation of a Malarial Bibliography.*—Major Sinton, who has been entrusted with this work, said that there was an impression in Europe and America that little work had been done in this country on malaria; the real truth was that much had been done, but that little notice was taken of each individual piece of work and some most valuable reports were buried in the provincial Secretariats; the quickest and surest way to get access to these reports was to visit each Secretariat in turn and dig out the information. The Government of India had made special arrangements

for his tour of inquiry which had begun and would last three months.

(xxviii) *Plague Inquiry in the United Provinces under the supervision of the Director of Public Health.*—Lieutenant-Colonel Dunn explained that this was only the nucleus of a much larger inquiry which he hoped to undertake next year; he gave a few examples of the results of the inquiry. He had found that the percentage of the different species of flea varied markedly from month to month, from village to village and even within a village; a very large staff of medical officers of health were employed in various parts of the province testing the late Major Cragg's theory that *astia* does not play an important part in spreading the disease; as a whole the figures supported this suggestion but in certain areas they appeared to contradict it. The work was proceeding.

(xxix) *Plague Inquiry at the Haffkine Institute, Bombay.*—Major Morison explained that various forms of medicinal treatment for the disease were being tested on infected rats; infection experiments on rats were also being carried out and it had been observed that, at certain times of the year, infection would not take place.

(xxx) *Cholera Statistical Inquiry by the Director of Public Health, Madras.*—Major Russell said that the Madras figures had given some very interesting results, so that inquiry had been extended to embrace the figures of other provinces.

(xxxi) *Cholera Inquiry in Bengal by the Director of Public Health.*—Lieutenant-Colonel Fry explained on behalf of Major Stewart that investigations had been started in two centres, one at Khulna and the other at Mymensingh; in the former, five infected villages had been examined and in only one of these was there definite evidence of spread by migration; serological and bacteriological examination of the blood and stools of the contacts was undertaken. In the latter area no infected villages were found, but a village which had an epidemic last year was examined. The work was proceeding.

(xxxii) *Researches on Cholera Treatment by the Director of Public Health, Madras.*—Major Russell stated that this work had only just commenced; a large number of doses of ordinary cholera vaccine had been given and about 2,000 doses of Professor Besredka's bilivaccine had been obtained and distributed in certain villages where careful watch could be kept on the results and as effective a control as possible arranged for.

(xxxiii) *Schistosomiasis Inquiry by the Director of Public Health, Burma.*

(xxxiv) *Beri-beri Inquiry by the Director of Public Health, Burma.*—Major Taylor said that eight cases of schistosomiasis had been reported but since then no further cases had been observed so that little investigation could be carried out. With reference to the beri-beri inquiry it had been observed that small outbreaks occurred in isolated places such as schools and police outposts; the outbreaks usually occurred at the end of the monsoon and the rice was usually found to be in a bad condition and badly stored.

(xxxv) *Field Ankylostomiasis Inquiry by Dr. Chandler.*—Lieutenant-Colonel Megaw explained that this inquiry had only just been commenced and that Dr. Chandler who would be present on the following day would give details of the line of research.

(xxxvi) *Deficiency Diseases Inquiry by Lieutenant-Colonel McCarrison, I.M.S.*—Lieutenant-Colonel McCarrison said that he considered that the absence of vitamin B. was a very important factor in the production of epidemic diseases and that it was a factor which was overlooked by most workers; he said that he had now been able to produce real beri-beri in pigeons and that this was a very different disease from polyneuritis gallinarum. He was carrying out experiments with different varieties of grain and was also testing the effect of different manures on various varieties of grain.

Second day (16th December, 1925).

The Conference met at 10-30 A.M.; the discussion on the research programme at present in operation was continued.

(xxxvii) *Maternal Mortality and Morbidity in Child-birth in India.*—Lieutenant-Colonel Graham explained the nature of this inquiry, emphasised its importance, and stated that Dr. Margaret Balfour had come to India at her own expense to work on this subject; the sum granted was to cover expenses connected with the inquiry. Dr. Balfour will have at her disposal a pathologist supplied through the kindness of Dr. Scott from the Women's Medical Service.

(xxxviii) *Lathyrism Inquiry by Dr. Simonsen in England.*—Lieutenant-Colonel Graham explained that this sum had been granted for expenses in connection with the lathyrism inquiry; Dr. Simonsen while on leave wished to take advantage of the special laboratory facilities at his disposal in England in order to work out certain chemical details.

(xxxix) *The Bio-chemical Section at the Haffkine Institute, Bombay.*—Major Morison said that the bio-chemical section had been working on sprue until August this year but, since Major Sokhey had taken charge, work had been done on vaccine therapy.

(xl) *Cholera Inquiry in the Asansol Mining Settlement.*—Dr. Tomb, Chief Sanitary Officer, Asansol Mines Board Area, who is directing this inquiry, described the lines on which the inquiry was to be carried out; he was being assisted by Captain Maitra, I.M.S., who was carrying out the bacteriological work of the inquiry.

(xli) *Relapsing Fever Inquiry.*—Lieutenant-Colonel Cunningham explained that this inquiry had been going on for some time prior to his furlough, at the King Institute, Guindy, and had been financed by the funds of this Institute; but he was now appealing for a grant-in-aid to continue this work at Kasauli. One of the points that this inquiry had so far brought to light was that, serologically, the organism that produced the first attack differed entirely from that causing the relapses; if one called the primary organism A then the organism that appeared to cause the relapse was B, but if the primary organism had the serological characteristics of B, then the organism causing the relapse would be A. This phenomenon required further investigation.

(xlii) *Inquiry on Dog Piroplasmiasis in Madras.*—Lieutenant-Colonel Graham spoke regarding this inquiry in Major-General Symons' absence.

The Conference then proceeded to consider the research programme for 1926-27 on the basis of the present income of the Association. The President invited the members to state the lines on which they proposed to carry out their several researches during the next year.

(1) *Malaria.*—(i) *Quinine and Malaria Inquiry by Major Sinton.*—Major Sinton said that this inquiry had been going on during the last few years but that as he was hoping to go on leave shortly it was for consideration whether the inquiry should be continued. The Director of Medical Services in India had very kindly deputed Captain Bird, R.A.M.C., to take charge of the Convalescent Malarial Depot and to act as his assistant in this side of the inquiry with a view to his carrying on the work when he, Major Sinton, went on leave. It was an important inquiry and should be continued. Lieutenant-Colonel Graham said that the work of Majors Acton and Sinton on quinine and other cinchona alkaloids had been quoted at a recent Cinchona Conference and had helped to influence the decisions of this Conference. He also pointed out that the League of Nations had started an inquiry into the world production of quinine and other cinchona alkaloids and would soon be anxious to quote our work so that the subject should be considered an important one. Major Acton said that there were many important points to be investigated yet, such as the least possible dose of

quinine or other alkaloid that would produce a given percentage of cures. Lieutenant-Colonel Graham proposed and Major Acton seconded a proposal that this inquiry should be continued; the Conference unanimously supported the proposal.

(ii) *Malaria Inquiry by Major Hughes at Lahore.*—Lieutenant-Colonel Graham explained this in detail and Major Sinton said that this inquiry was being carried on in close association with his work and considered that it should be continued; the Conference agreed.

(2) *Plague.*—(i) *Anti-plague Vaccine Inquiry at the Haffkine Institute, Bombay.*—Major Morison suggested that this inquiry should be continued; the Conference agreed.

(ii) *Plague Inquiry in the United Provinces under the Director of Public Health.*—Lieutenant-Colonel Dunn said that this inquiry would continue during the next year; the United Provinces Government had made a grant; but, by an error, no proposals had been sent to the Indian Research Fund Association; he said that the grant-in-aid given last year had not been fully expended as it was for a period of one year but he was afraid that the work would be hampered if no further grant were made next year.

The President said that he concluded that the demand had the sympathy of the Conference but that Lieutenant-Colonel Dunn's new demand would have to be considered by the Scientific Advisory Board, when he put up his proposals. The Conference agreed.

(3) *Cholera.*—(i) *Cholera and Small-pox Statistical Inquiry by Major Russell.*—Major Russell suggested that this inquiry should be continued during the next year; the Conference agreed.

(ii) *Geographical Surveys of Cholera, Plague and Relapsing Fever and Researches on Cholera Vaccine Therapy and Cholera Treatment by Major Russell, I.M.S., Director of Public Health, Madras.*—Major Russell explaining this demand said that the largest item was for the purchase of bilivaccine. Major Taylor said that as the value of this vaccine was by no means proven and as, even if it were given on a large scale, there would be considerable difficulty in estimating the results, he considered that the sum proposed to be expended was rather a large one. Captain Maitra said he had tried the oral vaccines in animals and found that agglutinins appeared in their blood; he considered that an experiment of this nature on man was important. Lieutenant-Colonel Graham pointed out that the vaccine had been tried in Europe and was looked upon favourably, that the eyes of the Office International d'Hygiene Publique and of the Health Committee of the League of Nations were focussed on India's attitude in regard to cholera prevention and that there did not seem to be any excuse for holding back a trial of it in India. A general discussion followed. The President pointed out that last year this same Conference suggested the importance of accurate disease surveys and that if they did not support the demand made by Major Russell's inquiry they would be going back on their last year's resolution. The question was put to the vote and the meeting unanimously supported the demand.

(iii) *Cholera Inquiry in Bengal by the Director of Public Health.*—Lieutenant-Colonel Fry said that Bengal was universally accepted as the home of cholera; an interesting point was to know how the disease was carried over from season to season. The work that was being undertaken was directed mainly at solving this problem. The Conference agreed to the continuing of this investigation.

(iv) *Cholera Inquiry in the Asansol Mining Settlement by Dr. Tomb.*—Dr. Tomb said that the work would be carried out on the lines on which they had already begun. The Conference agreed to this grant.

(4) *Helminthology.*—(i) *Helminthology Inquiry by Dr. Korke.*—Lieutenant-Colonel Graham explained that there were two proposals, one that the work should be continued on the lines which had been approved last year, in which case the demand was for Rs. 17,535, and the second was for a further scheme which would

mean an addition of Rs. 4,465. Dr. Korke said that the subjects of entomology and veterinary science were so intermixed with this subject that it was advisable for him to have a veterinary and an entomological assistant; the extra demand was for the pay of these two assistants. A discussion followed. The opinion of the Conference was taken and it was decided that the grant for the inquiry on the lines on which it was carried out last year should be made, but that the question of increased grant should be referred to the Scientific Advisory Board.

(ii) *Field Ankylostomiasis Inquiry by Dr. Chandler.*—Dr. Chandler asked that this inquiry might be continued during the ensuing year; the conference agreed.

(iii) *Helminthic Survey at Dehra Dun.*—It was agreed that this research should be continued.

(5) *Kala-azar.*—(i) *Kala-azar Treatment Inquiry by Dr. Brahmachari.*—Dr. Brahmachari explained that the work would be carried on on the same lines as heretofore. The Conference approved of the continuation of the inquiry but suggested that certain details with regard to the pay of the staff should be referred to the Scientific Advisory Board for decision.

(ii) *Kala-azar Commission.*—The continuance of this was approved.

(iii) *Kala-azar Inquiry at the Calcutta School of Tropical Medicine.*—Major Knowles considered that it was important that this inquiry should be continued as the problem of how kala-azar was transmitted was not yet fully solved, and, even when this was solved, there was much work to be done on the subject of prevention. The Conference agreed.

(6) *Leprosy Inquiries by Dr. Muir and Dr. Nishi Kanta De.*—It was agreed that these inquiries should be continued.

(7) *Bovine Tuberculosis Inquiry by Dr. Soparkar.*—Dr. Soparkar suggested that this inquiry should be continued on the lines on which it was at present being carried on. Lieutenant-Colonel Graham gave a resumé of the position as discussed between the Government of India Agricultural Adviser, the First Bacteriologist at Muktesar and himself and pointed out that, heretofore, animals for the experiments had been supplied by the agricultural department but that in future there might be difficulty about animals. He suggested that the whole matter be referred to the Scientific Advisory Board; the Conference agreed.

(8) *Spruce Inquiry at the Haffkine Institute, Bombay.*—The Conference agreed to the continuance of this inquiry.

(9) *Indian Indigenous Drugs Inquiry.*—Major Chopra said that the work would be continued on the same lines as heretofore; the Conference agreed that the inquiry should continue.

(10) *Beri-beri Inquiry by the Director of Public Health, Burma.*—It was agreed that this inquiry should continue.

(11) *Deficiency Diseases Inquiry by Lieutenant-Colonel McCarrison, I.M.S.*—Lieutenant-Colonel McCarrison considered that malnutrition through improper diet was one of the principal causes of disease in India and that the subject on which he was working was one of the greatest importance; he proposed to continue on the lines on which he had been working this year; the Conference agreed to the continuance of this inquiry.

(12) *Maternal Mortality and Morbidity Inquiry at Bombay.*—Lieutenant-Colonel Graham read a letter from Dr. Balfour outlining her programme of research; the Conference approved of the continuance of this inquiry.

(13) The six inquiries being carried out by officers in military employment were then discussed. Lieutenant-Colonel Mackenzie outlined the various programmes, and Lieutenant-Colonel Graham supplemented by further details. The following inquiries were approved by the Conference:—

(i) Heat Stroke Inquiry at Allahabad.

(ii) Researches at the Poona District Laboratory by Major Manifold.

(iii) Researches at the Wellington District Laboratory by Major Dunbar.

(iv) Researches at the Calcutta District Laboratory by Captain Mearns.

(v) Complement Fixation Test for Malaria by Major Little at Mhow.

It was suggested that the following inquiry should be referred to the Scientific Advisory Board for further consideration:—

(vi) Anæmia Inquiry at Colaba by Captain Basu, I.M.S.

(14) *Lathyrism Inquiry by Major Anderson, I.M.S.*—Lieutenant-Colonel Graham said that Major Anderson would presently proceed on leave; there was a proposal to extend the scope of this inquiry and if this were done it would probably be essential and advisable to employ a whole-time worker. There were various points to be considered and he thought that it was a matter that might be left to the Scientific Advisory Board; the Conference agreed to this.

(15) *Indian Culicidæ Inquiry by Captain Barraud.*—Lieutenant-Colonel Graham read a letter from Captain Barraud and explained that he was continuing the inquiry in his spare time and during the "off" sandfly season in Assam. The continuance of this inquiry was agreed to.

(16) *One-half the recurring charges of the Bio-chemical section at the Haffkine Institute, Bombay.*—This expenditure which had already been agreed to by the Governing Body was approved by the Conference.

(17) *Cost of two Professors at the Calcutta School of Tropical Medicine.*—Lieutenant-Colonel Megaw explained that, although these were nominally teaching appointments, the Professors had time for research work and the amount of work turned out by each of them in his opinion alone justified the expenditure; if this sum had not been granted originally by the Scientific Advisory Board the School would most probably never have come into existence, and that its existence was still to a large extent dependent on the continuation of this grant. He also pointed out the very important work performed by the School in teaching young research workers. The continuance of the grant was unanimously approved.

The three items in connection with administration, the *Indian Journal of Medical Research* and the Library at Kasauli were passed by the Conference without discussion.

(18) *Relapsing Fever Inquiry by Lieutenant-Colonel Cunningham.*—Lieutenant-Colonel Cunningham had already explained the lines on which the inquiry was being carried out; the Conference agreed to its continuance.

(B) Proposals for new inquiries to be undertaken during 1926-27 were then discussed.

(19) *Skin Diseases Inquiry by Major Acton at Calcutta.*—Major Acton said that the subject of skin diseases was very much neglected in this country and that as he had now worked up a large out-patient department he felt that there was a good opportunity for doing some research work on this subject; many skin diseases appeared to be due to intestinal intoxication; this was one of the points which he proposed to investigate. The Conference approved of this inquiry.

(20) Lieutenant-Colonel Graham suggested that consideration of the other five new military inquiries which had been proposed might be left to the Scientific Advisory Board as full details of these inquiries were not available and more information regarding them was essential. This was agreed to.

(21) Lieutenant-Colonel Graham explained that two other proposals had been received too late for inclusion in the schedule; the first was an inquiry by Major Wright into the bacteriology of endocular inflammation and the second was on cancer by Dr. Chatterjee. Major Acton reminded the Conference that a short time ago Major Wright had been a valuable bacteriological worker and strongly supported the request of this grant; Lieutenant-Colonel Cunningham seconded this proposal

and the Conference agreed that it should have the sympathetic consideration of the Scientific Advisory Board. *Re* the other proposal from Dr. Chatterjee to carry out research on cancer, Lieutenant-Colonel Graham said that he thought that it was a matter for the Scientific Advisory Board to settle. The suggestion was agreed to.

Third day (17th December, 1925).

The Conference having met at 10 A.M., the President opened the proceedings by reading the following note prepared by the Secretary, on the proposal for a permanent Central Malaria Organisation:

"The note which has been prepared by the Director, Central Research Institute, Kasauli, in consultation with the Director-General, Indian Medical Service, and the Public Health Commissioner with the Government of India, embodies proposals for the creation of a permanent malarial section at the Central Research Institute, Kasauli. We are agreed on the necessity for this and on the general lines of policy which resolve themselves into:—

(a) arrangements for the continuation of malaria classes on lines approximating to what existed ten years ago, but under a more permanent organisation,

(b) arrangements for extension of the Malarial Department at Kasauli so as to form a definite and complete section of the permanent organisation,

(c) necessary building extensions at the Central Research Institute, Kasauli, to accommodate the proposed section and to allow of immediate expansion on the lines indicated.

"The malaria class was revived during June, 1925. For the future, we must look towards the creation of a field experimental laboratory or station in the plains, and enquiries are now being made with a view to a suitable location for the next class. Pending the erection of a permanent station on the lines of that on the Roman Campagna, temporary accommodation will be required to meet immediate needs.

"The permanent central malarial organisation should consist of an adequate staff, suitable buildings, and provision for contingent and other expenses. These have been elaborated in the note. Though it may not be possible to create this permanent organisation immediately, it might well be accepted in principle and worked to as financial conditions permit. From a technical point of view there can be no two opinions regarding the necessity for this staff if we wish to create a central malarial organisation commensurate with the needs of India.

"Had the Imperial Institute of Research at Delhi materialised as proposed, accommodation on more elaborate lines than that now suggested for the Central Research Institute, Kasauli, and for the field experimental station would have been made available. The present dearth of accommodation at the Kasauli Institute is highly unsatisfactory. Increasing activities in various directions have led to overcrowding, and the existing Entomological and Malarial Bureau are tucked away in an out-building, part of which is a central store. Here their present activities are hopelessly cramped and there is no room for expansion, whilst, in the main block, the library has overflowed into the corridors and the position is much the same.

"In the order of priority determined at Calcutta last November, expenditure on malaria came first. It is felt that if we move forward on the lines proposed, we shall be laying a sound foundation for the future campaign against this disease in India."

Lieutenant-Colonel Christophers then gave further details of the scheme. He concluded by saying that the Conference must decide whether it was satisfied or was not satisfied with the present organisation; if the latter, then it must make suggestions for the improvement of this organisation. He considered that there should be both a central and provincial organisations; provinces should be urged to help in the matter; the scheme which he had outlined was for the central organisation; it was only a provisional scheme which he would like to see altered for the better.

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Lieutenant-Colonel Gill said that everybody would agree as to the economic importance of malaria in India. The proposal of Lieutenant-Colonel Christophers appeared to him to be a most important one. Did his proposals go far enough? Should there not be experimental stations erected in each province? Little work was now being done on the epidemiology of the disease. The question of *A. rossi* as a carrier had still to be settled. The main trouble up to the present had been lack of continuity in the organisation; he had got a malaria bureau equipped for his province but nothing outside routine work was done because he had no skilled officer to do the work. If such an officer were available much good work could be done. It seemed very important that there should be definite official collaboration between the central and the provincial organisations. Lieutenant-Colonel Gill hoped that a resolution on the subject would be passed.

Lieutenant-Colonel Dunn supported Lieutenant-Colonel Gill; he considered that the main work of the central organisation should be research work; he said that grants for a malarial organisation should be given to those provinces who helped themselves. Major Phillips said that in the United Provinces in the early days of the provincial malaria organisation between 1910 and 1914 a number of surveys were carried out in towns which were supposed to be malarious. The reports were transmitted to the central organisation, who, if they approved of the recommendations made, gave grants-in-aid to help in carrying out these recommendations. In 1923 some of the results were assessed; it was found that the existing malarial conditions varied according to the manner in which these recommendations had been carried out. A report was circulated and its effects had been very marked; members of the Legislative Council and Local Bodies had had their eyes opened as to the importance of the subject, and now large sums were being voted in the United Provinces for the control of malaria. He concluded by saying that what was wanted now was an expert officer to guide them as to how the money should be best spent. A general discussion followed.

After discussion a resolution was framed and proposed by Lieutenant-Colonel Christophers seconded by Lieutenant-Colonel Megaw and carried unanimously (*vide* Resolution 2, Appendix).

The Conference then proceeded to discuss the steps necessary for the co-ordination and promotion of medical research in India. Lieutenant-Colonel Graham opened the discussion by stating that, taking the research programme that had been approved by this Conference, there would probably be a credit balance this year of about half a lakh; it was for the Conference to decide whether in view of this fact they were justified in asking for the return of the full five lakhs grant-in-aid. A general discussion followed. Lieutenant-Colonels Dunn, Cunningham and Hodgson and Drs. Chandler and Brahmachari pointed out that research was still required in a number of diseases, such as cholera, pregnancy, anæmias, filariasis, blackwater fever; Major Taylor considered that there were many problems requiring solution, but that there was a difficulty at present in finding workers of the right type. Lieutenant-Colonel Megaw pointed out that the main obstacle to finding research workers was the fact that continuity of employment was not guaranteed. Lieutenant-Colonel Christophers said that the determining factor in the whole matter was the personnel. The matter of recruitment seemed to be an urgent one and should be discussed immediately.

Lieutenant-Colonel Hodgson considered that the trouble originated from the fact that an insufficient number of officers of the right type applied for admission into the Department because they were never interested in the subject of research; he considered that if more officers were sent to the Calcutta School of Tropical Medicine for training, more men would become interested in research work and from these men suitable officers could be chosen.

Lieutenant-Colonel Graham said that the Director of Medical Services in India was not in a position to give up all such officers. The matter had reached a point when they would probably have to recruit officers in the open market. Lieutenant-Colonel Fry asked whether it would not be possible to recruit officers for the Indian Medical Service on the definite understanding that they would be transferred to the Department at an early date. Lieutenant-Colonel Dunn suggested that certain officers might be seconded from the R. A. M. C. for research work for a short period. Lieutenant-Colonel Graham pointed out that 'seconding' was not possible and Lieutenant-Colonel Mackenzie spoke as to the shortage of officers.

Lieutenant-Colonel Christophers' resolution (amended) was read; it was seconded by Lieutenant-Colonel Megaw and carried unanimously (*vide* Resolution 3, Appendix).

Referring to the proposal to invite the Rockefeller Foundation to examine medical organization in India, Lieutenant-Colonel Cunningham asked why this invitation should be made. Lieutenant-Colonel Graham replied that, unless this invitation were offered by the Government of India, the Rockefeller Foundation would not consider the question of giving any financial assistance to any research institute or scheme in India.

Lieutenant-Colonel Megaw read letters from Dr. Heiser, dated 1923, on this particular point. Lieutenant-Colonel Megaw said that a few objections had been raised. The word "Commission" had been taken exception to; but there would be no obligation to undertake any of the suggestions if they were unacceptable. If London was not too proud to accept a million pounds from the Rockefeller International Health Board, surely India should not be too proud to accept help.

Lieutenant-Colonel Graham said that the Rockefeller Board had supported large schemes in Australia and that in this case certain stipulations had been made; he said that no friction had occurred as a result of the terms, and the whole scheme had been greatly to the benefit of the country and had accelerated the maturation of the present Ministry of Health.

Lieutenant-Colonel Megaw proposed a resolution which was seconded by Major Acton and unanimously passed (*vide* Resolution 8, Appendix).

A discussion then took place on how best to secure that the discoveries already made by medical research workers should be applied for the benefit of the people of India. Major Morison said that certain investigations were worked to a conclusion, but the matter went no further, as there was often nobody willing or ready to apply the results of the inquiry; an example of this failure occurred in connection with the guinea-worm research. It seemed desirable that a certain amount of money should be devoted to the application of research in order that the value of certain methods might be demonstrated to the population. Lieutenant-Colonels Bisset, Dunn and Gill entered into the discussion; they were of the opinion that it was a matter for the provincial health departments; the last named was of the opinion that the whole thing was a matter of education and that application of various methods should not go ahead of public opinion.

The President said that there was a principle involved which had been dealt with by the Scientific Advisory Board who had decided that the application of the results of research work on a large scale came outside the scope of the Funds of the Association.

Lieutenant-Colonel Graham said that he thought that experimental application on a strictly limited scale would be a proper charge on the Fund. Lieutenant-Colonel Christophers said that he thought it was often advisable for the application of research to be carried on at the same time as the research and Dr. Chandler considered that it was impossible to draw a line between research work in the laboratory and its application on a large scale in the field.

Lieutenant-Colonel Hodgson suggested that much could be done by educating the public and suggested that the publicity bureau be asked to press the matter of publication of resumé's of papers that appear in the

Indian Journal of Medical Research. In answer to this suggestion, Lieutenant-Colonel Graham pointed out that the publicity bureau and some leading daily papers always received a resumé of such papers as were considered suitable.

Major Morison suggested a resolution which, after redrafting, was proposed by him and seconded by Lieutenant-Colonel Christophers and unanimously adopted by the Conference (*vide* Resolution 4, Appendix).

Lieutenant-Colonel Graham then opened the discussion on the preliminary steps necessary to meet the occasion of the Far Eastern Association of the Tropical Medicine Congress in India in 1927; he said that it was not proposed that the Conference should enter into details but only lay down the general principles for the organisation of this Congress and he gave some excerpts from a letter from Tokio from Lieutenant-Colonel Mackie, and called on Lieutenant-Colonel Megaw to supplement this.

Lieutenant-Colonel Megaw said that he was present at the Congress held at Tokio in 1925; from a scientific point of view that Congress was in some ways rather disappointing as, on account of the enormous mass of material that was dealt with, it was impossible to hear even half the papers. He said that he thought we should be able to compete with the 1925 Congress from the scientific point of view; but he was afraid that, from a social point of view, we should have considerable difficulty in competing with them, as in Japan they had received lavish hospitality. The situation would be a difficult one, and he thought that it was essential that a whole-time officer should be appointed for at least one year before the Congress to deal with the situation; he felt that the honour of the Indian Empire was at stake. Lieutenant-Colonels Cunningham and Christophers, who had both attended one of these Congresses supported Lieutenant-Colonel Megaw's suggestion that an early start was of the utmost importance.

Lieutenant-Colonel Megaw proposed a resolution which was seconded by Lieutenant-Colonel Gill and adopted unanimously by the Conference (*vide* Resolution 7, Appendix).

Lieutenant-Colonel Cunningham said that experience at the International Malarial Congress at Rome showed that the malariologists of other countries were apparently unaware of the work which had been done in India on this subject. If this were true with regard to malaria, it was almost certainly the case with regard to Indian research work in general. Further steps were therefore required to 'broadcast' the work of Indian research workers:—

(i) By a further distribution of the *Indian Journal of Medical Research* amongst the research workers of other countries.

(ii) By a wider distribution of reprints by workers themselves.

The second method would appear to be preferable both on account of expense and efficiency. It would be cheaper in that only that part of the *Journal* which was of interest to any particular worker would be sent to him. A reprint makes a more personal appeal. Notice is therefore more likely to be taken of it. It is a more effective means of reaching those interested, because its distribution is in the hands of the author himself who is presumably more in touch with other workers on similar lines than those responsible for the issue of the *Journal* can be.

The prohibitive price charged for reprints by the present publishers of the *Journal* prevents any really effective circulation as far as most workers are concerned. It is suggested that assistance in this direction would be a proper charge on the Indian Research Fund.

Lieutenant-Colonel Ross's amendment was put to the meeting and carried by 15 votes to 5, and the original resolution was modified to meet the amendment and carried (*vide* Resolution 5, Appendix).

Lieutenant-Colonel McCarrison proposed a vote of thanks to the President.

The Conference was then declared closed.

APPENDIX.

RESOLUTIONS PASSED BY THE MEDICAL RESEARCH WORKERS' CONFERENCE IN DECEMBER, 1925.

1. The Conference after having discussed the research proposals put forward for the financial year 1926-27 both in their scientific and financial aspects, and having re-endorsed the priority research proposals of last year is of opinion that an ample case exists for the restoration of the full grant-in-aid of five lakhs.

2. The Conference is impressed with the great need for a permanent organisation for carrying out continuous and adequate investigation in regard to the prevention of malaria in India and strongly recommends to Government that a permanent central organisation on the lines proposed by Lieutenant-Colonel Christophers be early constituted.

The Conference also wishes to call attention to the necessity of creating adequate provincial malaria organisations working in collaboration with the central organisation and considers that the constitution of such organisations (*which should include at least one effective malaria worker*) ought to receive urgent and early attention by local Governments.

3. In view of the fact that whether from the point of view of adequately staffing of existing laboratories or of carrying on necessary researches in the field, the existing numbers of sanctioned appointments is inadequate, the Conference strongly urges the restoration to the pre-Inchcape numerical standard in the Research Department.

The Conference, having in view the fact that lack of sufficient first class research workers is already gravely interfering with the carrying out of urgently needed important researches in India, and is likely to become more acute in the future unless steps are taken to prevent this, is of opinion that workers of the required scientific status and experience should now be recruited, as circumstances dictate, from the open market.

In order to obtain the services of suitable men the Conference is of opinion that it will be necessary to give considerable thought to making such posts attractive both from the point of view of salary and of tenure of appointment and prospects.

The Conference is of opinion that this is an urgent matter and that steps of some kind should be taken at once.

4. This Conference, while recognising that the onus of carrying out the practical application of proved researches of public utility is a matter generally falling within the legitimate work of the various local Governments' public health departments, would yet insist that there are many experimental applications of research work which may legitimately be regarded as part of these researches, and that such, if considered on their merits, might suitably be eligible for being financed by the Indian Research Fund Association.

5. Seeing that it is a matter of great importance that the work of research workers in India be brought to the notice of workers of other nations and that the best means of achieving this is to encourage the distribution of reprints of publications in the *Journal* to the greatest possible extent, the Conference is of opinion that arrangements should be made for the issue to the authors of additional reprints at specially reduced rates.

6. This Conference re-affirms resolution No. 7 of last year's Conference* which was unanimous, and desires to impress on Government the fact that the health of the worker is of great importance in connection with any scheme for the improvement of agriculture in India.

(* Note.—Resolution No. 7 of the 1924 Conference runs as follows:—

"Proposed by Lieutenant-Colonel Megaw and seconded by Dr. Bentley:

That this Conference believes that the average number of deaths resulting every year from preventable disease in India is about five to six millions, that the average number of days lost to labour by each person

in India from preventible disease is not less than a fortnight to three weeks in each year, that the percentage loss of efficiency of the average person in India from preventible malnutrition and disease is not less than twenty per cent., and that the percentage of infants born in India, who reach a wage earning age is about 50 per cent. whereas it is quite possible to raise this percentage to 80 to 90 per cent.

The Conference believes that these estimates are under-statements rather than exaggerations, but, allowing for the greatest possible margin of error, it is absolutely certain that the wastage of life and efficiency which result from preventible disease costs India several hundreds of crores of rupees each year. Added to this is the great suffering which affects many millions of people every year.

This Conference believes that it is possible to prevent a great proportion of this waste at a cost which is small in comparison with the results obtained.

The recent census shows that the position in India is one of grave emergency. The Conference recognises that the problem is very complicated and involves not merely medical research, but also questions of public health, medical relief, medical education, propaganda, and social and economic considerations.

The Conference strongly urges on Government the immediate necessity for appointing a strong Commission, chiefly non-technical, for the purpose of making a thorough inquiry into the wastage of life and the economic depression in India which result from causes which are capable of being remedied.

The Conference believes that the greatest cause of poverty and financial stringency in India is loss of efficiency resulting from preventible disease and therefore considers that lack of funds, far from being a reason for postponing the enquiry, is a strong reason for immediate investigation of the question."

7. The Conference is of opinion that the forthcoming Congress of the Far Eastern Association of Tropical Medicine to be held in India in 1927 will necessitate a considerable preparation on the part of the Government and considers that in view of the time required for the various necessary negotiations, publications, etc., such preparations, etc., should be commenced at once. The Conference proposes that a provisional committee with a Secretary be at once formed to discuss and take early action in regard to the initiation of the organisations necessary in this matter.

The Conference is of opinion that a whole time worker with adequate staff will be required for at least twelve months beforehand and that arrangements for the Congress should be initiated at least eighteen months before the Congress meets.

8. The Conference strongly recommends to the Scientific Advisory Board that the Government of India be urged to issue an invitation to the Rockefeller Foundation to make a survey of medical education and research in India.

Some Pitfalls in Surgical Diagnosis.

By SIR HERBERT F. WATERHOUSE, F.R.C.S.
(Practitioner, Jan. 1926, p. 4.)

Acute Osteomyelitis is the commonest surgical condition in which diagnosis is most frequently not made until irreparable damage has been done. Sir Herbert has always been greatly interested in the disease, having produced it artificially, when working at the University of Gottingen in 1888-9, under the supervision of the late Professor Orth, by injecting pyogenic microbes into the veins of the ear in animals, and causing minor injuries to the bones.

There are two types:—(1) The ultra-acute type caused by the virulent *Staphylococcus aureus*; and (2) the type less violent in its onset, caused by *Staphylococcus albus*, *streptococcus*, *pneumococcus*, *Bacillus coli*, *Bacillus typhosus*, etc. The former type ought always to be diagnosed at the onset, because the symptoms are definite and unmistakable. In the latter type

an error in diagnosis is much more pardonable. In severe cases the initial symptoms will be a sudden rise of temperature to 103° or 104°F., often a rigor, intense toxæmia, vomiting, headache, and even delirium. In the milder cases the temperature may, at first, only be raised a degree, the constitutional symptoms may be scarcely noticeable, and in the case of the lower limb, the patient may be able to walk a short distance without much complaint of pain.

Acute osteomyelitis in an adult is not always of the relapsing variety, i.e., a recrudescence of the disease starting in childhood. In cases originating in adult age the disease more frequently starts about the middle of the shaft of a long bone, and not, as in children, at one end of the diaphysis. The cases in adults are almost invariably missed in diagnosis until pus reaches the periosteum.

Another common error is that the disease only occurs in the long bones. No bone in the body is exempt. It is not infrequently found in the ilium, the scapula, the flat bones of the skull, the sternum, and the os calcis. Acute osteomyelitis may follow a boil, an infection of the fingers, tonsillitis and pharyngitis; but the disease almost always occurs, not during the acute stage of the predisposing condition, but after it has subsided and is nearly forgotten.

In osteomyelitis the inflammation arising in the marrow frequently shows no signs of its presence except tenderness on deep pressure. The real reason for the condition being so frequently missed in its early stages, is that the practitioner expects to find the cardinal signs of inflammation present, viz., heat, redness, swelling, and pain. In the early easily curable stage of osteomyelitis there is no local heat, no tenderness, and no swelling. Pain varies in intensity and may be almost negligible. Osteomyelitis is frequently mistaken for acute rheumatism of the neighbouring joint but there is no effusion into the joint in the early stage of osteomyelitis, there is no superficial tenderness over the articulation as in inflammation of the joint, and the tenderness is either above or below the joint, not in the joint itself. The diagnosis should always be made within 24 to 36 hours, if necrosis is to be prevented.

A sudden rise of temperature, possibly a rigor, a feeling of malaise, a pain, which at first need not be severe, in a long bone just above or below a joint, and far more important, marked tenderness on firm, deep, and prolonged pressure over the site of the pain form the diagnostic features and it is dangerous to wait for further confirmation of the diagnosis. Given such signs it is the bounden duty of the medical attendant to have one or more openings made into the bone right down into the medullary cavity to relieve the tension and to save necrosis. Sir Herbert's advice is "Don't wait for a surgeon but take a gimlet or drill from a carpenter's tool-chest and, after boiling it, drill two or three holes into the bone yourself."

The bone ought to be drilled before pus has had time to form, and when only blood, swarming with staphylococci, or other microbes, oozes out.

Sub-phrenic Abscess.—This dangerous condition is generally missed. When, any time from two weeks to two months after a septic lesion in the abdominal cavity, a patient who has appeared to be well on the road to recovery develops continuous fever, elevation of pulse rate and malaise, and no definite cause can be found for the rapid deterioration in health, the possibility of a sub-phrenic abscess should be seriously considered. More than half of the cases seen by Sir Herbert have owed their origin to lesions of the appendix vermiformis. Next in order of frequency comes perforation of an ulcer on the posterior wall of the stomach into the lesser peritoneal sac. In this case the abscess is almost always under the left half of the diaphragm, those caused by appendicitis are practically invariably on the right side.

Percussion over the abscess is frequently most misleading. If the abscess is overlain with normal lung, percussion will give the normal note. If there be a basal pleural effusion the note will be dull. If the

abscess contains gas, as it frequently does, a tympanitic note will be elicited. Where possible an x-ray examination should always be made use of.

An effusion into the pleural sac caused by pleurisy, pneumonia, and empyema, or pulmonary infarct, starts suddenly with pain in the chest, and difficulty in breathing, whilst a sub-phrenic abscess takes days to develop, and is painless, certainly at the commencement.

A definite diagnosis of sub-phrenic abscess may only be possible by puncture with a needle of an aspirator; but this may only be done when everything is prepared for the drainage of the abscess. In a recent case pus was encountered only on the sixth insertion of the exploring needle. The practitioner must bear in mind the probability of a sub-phrenic abscess in cases in which, any time between two weeks and two months after any septic abdominal condition, the patient who has hitherto appeared to be making good progress develops a continuous high temperature, a constant quickening of the pulse rate, and a rapid deterioration of health, for which no obvious cause can be discovered.

The Period of Reaction after Perforation of a Gastric Ulcer.—In some instances of perforation of a gastric ulcer, a wonderful temporary improvement in the symptoms may occur before the graver signs of peritonitis develop, and this temporary improvement may be very misleading. When the surgeon can get no further in diagnosis than that of a very probable perforation of a gastric ulcer, immediate operative treatment is essential, because in every instance the lesion present has been either a perforated gastric ulcer or some condition equally calling for operative treatment. In perforation of a duodenal ulcer the period of reaction rarely shows anything like the same marked temporary amelioration of symptoms that is often noticed after gastric perforations.

Gangrene of the Appendix.—Sudden cessation of all symptoms and extraordinary temporary improvement may follow gangrene of the appendix. The late J. B. Murphy, of Chicago, once told Sir Herbert that "(1) The dead appendix ceases to absorb its noxious contents and, therefore, pulse and temperature fall to normal. (2) The nerves of the appendix are dead and, therefore, pain ceases. (3) Adhesions can only be formed between two living surfaces. The appendix being a dead thing, no adhesions will be formed to it and, therefore, there is the awful danger of diffuse septic peritonitis when the microbes pass through the gangrenous walls of the appendix, or it drops off."

Inversion of the Testis is hardly ever mentioned in the surgical text-books. Yet it has a considerable importance. In this condition the testicle is displaced, so that the epididymis is in front, and the body of the testicle behind it. The tunica vaginalis lies posterior to the body of the testis, and a hydrocele will, therefore, have the testis in front of it. It is not infrequent; in 100 adult men it was found present in three instances. Serious danger threatens when a hydrocele is tapped or operated upon in the case of inversion of the testis. When the general practitioner has to tap a hydrocele which is not translucent to transmitted light, he should enter the trocar on the outer side of the scrotum, instead of in front.

Prognosis in Cancer of the Breast.

By H. P. WINSBURY WHITE.

(*Practitioner*, Oct. 19, 1925.)

INFORMATION was obtained of 92 patients out of 120 who had been operated on at the Royal Free Hospital between 1900 and 1913. More than 50 per cent. of those traced died within 3 years of the operation, but over 20 per cent. survived for more than ten years. In two patients who survived more than 19 years the pectoral muscles were not removed. Altogether the more radical operation did not seem to give better results than the less thorough procedure involving only the breast and axillary contents, but the author does not advocate the incomplete operations because of the results shown in

a small series of figures. In 16 cases a preliminary excision of the tumour was made for diagnostic purposes; these cases did as well or better than the others, but presumably they were less advanced on the average as the diagnosis must have been in doubt at the time of the operation. Here again the author does not advocate exploratory excision except in really doubtful cases.

In all the cases in which death followed within 3 years there was either (a) fixation of the growth to the pectoral fascia or muscle; (b) fixation to the skin; (c) palpable axillary glands; or (d) microscopical evidence of growth in the axillary glands.

In the cases which survived for more than ten years these features were usually absent, in only one of them was there fixation of the growth to the pectoral fascia, but in several there were fixation to the skin, palpable axillary glands and in a few there was demonstrable carcinoma in the glands. The average duration of life was 3.6 years in the patients who had fixation of the growth to the pectoral fascia or muscle while it was 6.9 years in the remainder.

When there was proved metastasis in the axillary glands the average duration of life was 5.6 years compared with 6.1 years for the patients in whose cases metastasis could not be found.

More palpable enlargement of the axillary glands is no evidence of metastatic infiltration. Size of the growth in itself is not so important as would be expected, but the large growths are more frequently attached to the pectorals: when the growth is rapid there is a greater likelihood of visceral metastasis being established and the author suspects that these already exist in many cases at the time of operation. Skiagrams may reveal the larger, but cannot help in showing the smaller deposits. In several cases the growth was described as encephaloid; the prognosis in these does not appear to be any worse than in the others.

Modern Methods of Diagnosis.

(*Practitioner*, Jan. 1926, p. 1.)

IN the introduction to this special number, Sir Humphry Rolleston points out that laboratory methods supplement the diagnosis made by ordinary bedside examination, just as the microscope or the telescope increases the ordinary man's powers of observation. Physical signs deal mainly with the evidence produced by gross structural change, whereas laboratory methods not only may reveal structural changes, such as those in the blood, urine, cerebro-spinal fluid, and gastric secretions, which at best can only be guessed at by the unaided eye, but they may reveal the disorders of function which precede organic change.

There is a danger in relying too greatly upon the elaborate equipment possessed by every modern teaching hospital. Important as modern histological, hæmatological, bacteriological, and chemical examinations are in medicine, we must not over-estimate them or imagine that they make the older clinical methods of examination superfluous. Laboratory investigation must go hand in hand with the ordinary direct clinical examination of the patient.

Careful history taking and a thorough physical examination, with the exhibition of a due proportion of clinical acumen and common sense, serve the practitioner better than much laboratory lore. But the ideal is a critical judgment founded on the combined information supplied by the two methods, each serving as a supplement and check to the other.

The Virus of Tsutsugamushi Disease.

PROFESSOR NAGAYO and five other workers at the Government Institute of Infectious Diseases, Tokio (*Reports*, Vol. III for 1924), have described a virus which resembles Rickettsia bodies in connection with experimentally produced tsutsugamushi disease in monkeys.

In 1923 the same workers found that intradermal inoculation of the infected blood is most effective, resulting in a typical ulcer at the site of inoculation, whereas subcutaneous inoculation is never followed by ulcer formation. In tissues fixed with Orth's and Zenker's fluids and stained with azur II the large mononuclear cells of the skin of infected monkeys show numerous monococcal, diplococcal and short red forms of the organism in large numbers.

The virus is non-filtrable, non-culturable in the ordinary media and is transmitted in Nature only by a certain mite. The bodies are multiform and stain with difficulty. The bodies closely resemble those found in typhus fever and in the Rocky Mountain fever. The authors point out that the study of the Rickettsia bodies is incomplete, so that it is impossible to state that the bodies found by them are proved to belong to the Rickettsia group. If the virus of tsutsugamushi disease should prove to be similar to that of the other diseases of the typhus group, it will be possible to adopt the classification of these diseases which was provisionally suggested by Megaw, viz., louse typhus, tick typhus and mite typhus. From a clinical and epidemiological point of view this nomenclature has obvious advantages, it only remains to be seen whether it is justified on pathological grounds.

The Early Diagnosis of Disease of the Spinal Cord.

By SIR FREDERICK MOTT.

(Practitioner, October, 1925.)

THE first question to decide is whether we are dealing with a case of functional or organic disease, or a combination of the two.

A careful history of the onset and progress of the signs and symptoms should be made, noticing the mental attitude and behaviour of the patient; due regard being given to the fact that in hysterical cases there is always a danger of suggesting symptoms to the patient, especially in respect to sensory disturbances.

The onset is usually sudden, and the disability varies with the patient's emotional state, degree of attention, and the effects of external influences. After you have made a careful and methodical examination of the superficial and deep reflexes and found them all normal, you are justified in concluding that the paralysis, contracture, or inability to stand or walk (astasia, abasia), which may even have existed for months or years, is the result of auto-suggestion or hetero-suggestion, and you can then with confidence assure your patient that he or she can be cured. There is never unilateral increase of the deep reflexes, never genuine clonus, never a plantar extensor response. In functional cases, there is little or no wasting.

In functional sensory disabilities simulating spinal cord disease the superficial sensibility to pain, heat and cold, and touch, is lost completely; neither the anaesthesia nor the pains conform to the anatomical distribution of spinal roots or peripheral nerves. In the limbs the superficial anaesthesia takes the form of a stocking or gauntlet, and can easily be removed by suggestion, the restoration of sensibility being from above downwards. The secret of success in the treatment of these functional cases is faith; consequently, in the first treatment you must not leave the patient until you have established that by bettering or curing the disability. It may take minutes, it may take hours.

In patients who complain of pain in the spine test the reflexes, the sensory condition and ask about the sphincters, if these are normal and if movements of the spine are not attended with pain the condition is usually the result of suggestion.

Make a complete examination, mark down the site of the pain with a blue pencil, see whether the position cannot be altered by suggestion. If there is localized pain and tenderness which cannot be shifted by suggestion, organic disease is to be considered even in the complete absence of physical signs. Localized pain and

tenderness of the spine combined with a localization of pain in a skin area which corresponds to the same segment of the spinal cord are of great diagnostic importance in caries, new growth, aneurism, etc.

X-ray examination should be carried out in all such cases.

The pain of early cord disease may be neuralgic and variable in intensity, even paroxysmal: it is distinguished from true neuralgia by its segmental distribution. The pain of meningitis is often associated with local muscular rigidity and spasm, especially when the cervical region is involved. Lumbar puncture will often give the diagnosis in such cases.

Intercostal neuralgia and pleurodynia are often wrongly diagnosed in early disease affecting the nerve roots. Syphilis is a frequent cause of such root irritation.

The pain of peripheral neuritis is usually accompanied by tenderness on pressure of the calves and anaesthesia to light touch and the history will usually help. In all doubtful cases the Wassermann reaction should be carried out.

The pains of the pre-ataxic stage of tabes dorsalis are usually associated with the Argyll-Robertson pupil or with some inequality of the pupils, even if the knee jerks are still present.

Girdle pain is often an early symptom of focal meningitis or of progressive meningo-myelitis, the occurrence of this pain with paræsthesia should be the signal for active antisyphilitic treatment, to prevent the development of an incurable paraplegia resulting from complete transverse myelitis. In such cases lumbar puncture and the Wassermann test will usually give clear indications.

Abnormal sensation may also be caused by Raynaud's disease, arterial degeneration, neuritis, neurasthenia, etc. Short of actual pain, any feeling of numbness, tingling of pins and needles should arouse suspicion of organic disease and be followed by a thorough investigation, as they may be the earliest symptoms of myelitis or other organic disease. Total anaesthesia occurs only in cases of complete transverse lesion; dissociated anaesthesia is more common, loss of sense of a light touch may co-exist with unaffected deep sensibility.

In some spinal cord diseases sensory disturbances are transitory or even absent; in Landry's paralysis sensation may be unimpaired and the muscle electrical reactions may be normal: in anterior poliomyelitis there is fever, malaise, numbness and tingling in the limbs, soon followed by a flaccid paralysis and then wasting; the sensory disturbances are only transitory. In progressive muscular atrophy and amyotrophic lateral sclerosis there is no sensory trouble. Disseminated sclerosis though easy to detect in the well developed form, may easily be mistaken for neurasthenia when there are no cerebral manifestations.

Careful examination of the reflexes, especially of the plantar reflex will often give the diagnosis. The exact localisation of the lesion is very important in prognosis and in deciding on operation in the rare cases in which this is contemplated.

"More mistakes are made from not looking than from not knowing." Only a small percentage of cases complaining of pain in the spine suffer from disease of the spinal cord.

Blood Pressure in Diagnosis.

By SIR RICHARD DOUGLAS POWELL, Bart.,

K.C.V.O., M.D., F.R.C.P., D.Sc., LL.D.

(Practitioner, Jan. 1926, p. 42.)

A RELATIVELY high diastolic pressure indicates that with increased resistance the margin of heart-power is diminished. A high maximum with a relatively low diastolic pressure, i.e., a high pulse pressure, points to some defective support to the circulation as from impairment of aortic valves permitting regurgitation. Mental harassment and overstrain are the fruitful causes

of arterial tension. These are not uncommonly accompanied by irregular meals, rapid eating, dietetic indiscretions, and often irregularity or excess in alcohol. Premature arterial changes are observed in certain families. In case of high pressure the state of the gums and fauces must be examined for pyorrhœal or other septic conditions and the teeth looked to as a source of reflex irritation.

Defective function of the colon is also a frequent source of disturbance. Low specific gravity of the urine with raised blood-pressure suggests interstitial nephritis. A high specific gravity is less grave, suggesting excess of diet, defective exercise, etc., which can be corrected.

Alcoholic excess tends to lower pressure unless accompanied by organic changes, especially in the kidneys. Excess of smoking tends to raise blood-pressure in a spasmodic way.

Value of Examination of the Eye in Diagnosis.

By SIR RICHARD CRUISE, K.C.V.O., F.R.C.S.

(*Practitioner*, Jan. 1926, p. 23.)

Two instruments are needed by the practitioner, the binocular loupe and the electric ophthalmoscope.

Ptosis suggests third nerve paralysis of syphilitic or cerebral origin or myasthenia gravis.

Diffuse nebulae of the cornea if associated with remains of blood-vessels terminating at the scleral margin, detected by the binocular loupe suggest interstitial keratitis of syphilitic origin.

Phlyctenular ulcers suggest a toxi-tuberculous condition.

Localised nodules of the sclerotic suggest gouty, rheumatic or infective conditions.

No verdict should be pronounced upon a pupil till it has been examined with the binocular loupe—senile fibrosis of the iris or post-synechia from old iritis must be excluded. Unequal pupils are found in tabes and G.P.I. but a frequent cause is injury; so is pressure on the sympathetic from enlarged cervical glands.

The Fields of Vision can be taken effectively by standing straight in front of the patient at a distance of three feet; the patient has each eye in turn obscured; the observer has the opposite eye closed to that of the patient. The field of vision of the patient's right eye will correspond with the field of vision of the observer's left eye. The patient must fix, without wavering, the centre of the observer's pupil. A 10 mm. square of white paper on the end of a pen will readily elicit any gross defect. A central scotoma for small specks of colour, with full peripheral field of vision, suggests tobacco, alcohol, or diabetic poisoning, disseminated sclerosis, retinobulbar neuritis.

In paralysis of ocular muscles diplopia is the cardinal symptom. The ætiology of ocular paralysis is the ætiology of intracranial lesions, syphilis, vascular lesions, tumours, disseminated sclerosis, plus certain peripheral causes, such as diphtheria, "rheumatic" or infective conditions, associated with migraine—recurrent paralysis; it also follows injections into the spinal theca to produce anaesthesia. Injury is especially liable to involve the sixth nerve, which is not uncommonly affected after fracture of the base of the skull.

Nystagmus is a prominent symptom of disseminated sclerosis, cerebellar tumour, and labyrinthine disease; it affects miners as a form of occupation neurosis.

Examination of the fundus should be concentrated on the condition of (1) the optic nerve; (2) the blood-vessels; (3) the retina and choroid.

Papilloedema is seen as a marked striation of the margins of the disc with definite swelling and elevation of the nerve head above the plane of the retina. It is due to increased intracranial pressure; intracranial tumour of every description, hydrocephalus, meningitis (especially the tuberculous form), abscess, gumma, and neoplasm.

In optic neuritis there is a similar appearance of the optic nerve but the swelling never approaches the amount

seen in papilloedema; the retina is frequently involved, exhibiting cloudiness, hæmorrhages, and exudates (neuro-retinitis), the vision is greatly lowered, and the condition is frequently unilateral. The causes are toxæmia; syphilis, albuminuria, diabetes, influenza, and septic conditions in the mouth, nose, and throat, sinusitis, apical abscess of the teeth, etc.

In primary optic atrophy the disc margins are clearly defined, the disc is of a grey-white colour, and frequently the blood-vessels are unchanged. Tabes and G.P.I. are the usual causes, but the condition occurs in disseminated sclerosis, and as the result of pressure effects or injury. In optic atrophy secondary to previous optic neuritis, the disc margins are obscured, the physiological cup is filled in, and the vessels may have sheaths of fibrous tissue along them.

Arterio-sclerosis and high blood pressure can be diagnosed by sight; the thickened arteries can be seen to compress the veins where they cross each other, leading ultimately to obliteration of the lumen of the thin walled vein, and hæmorrhagic leaking along its course. Visible alterations in the calibre of the artery are diagnostic of arterio-sclerosis.

Syphilis, nephritis, and glycosuria are the principal causative agents of retinal inflammation. A diffuse cloudiness of the retina with optic neuritis and fine vitreous opacities will suggest syphilis. In albuminuric retinitis there is papillitis, congestion of the veins, flame-shaped hæmorrhages and white exudates in the peripapillary area.

In diabetes the changes are somewhat similar, except that papillitis is rare, the hæmorrhages are more frequently seen as discrete round spots, and glistening brilliant white patches and dots are of common occurrence.

Grossly disseminated patches of choroido-retinitis fringed with pigment are a frequent indication of syphilitic infection, whereas larger solitary areas of choroidal atrophy are suggestive of a tubercular origin.

The Value of Blood and Urine Examination in Renal Disease.

By HUGH MACLEAN, M.D., D.Sc., M.R.C.P.

(*Practitioner*, Jan. 1926, p. 67.)

THE estimation of the blood urea is usually carried out in the examination of renal patients. Many extra-renal conditions, such as cardiac disease, excessive diarrhoea, gastro-intestinal derangements, deep-seated abscesses and metabolic disturbances of various kinds may increase the blood urea. A high blood urea in itself is not a necessary indication of defective kidneys.

There is no increase in blood urea until about three-fourths of the normal kidney substance is rendered functionless; so that any information derived from blood urea estimation is confined to comparatively advanced cases of renal disease. Severe and progressive renal disease may be present without any protein appearing in the urine.

Albuminuria is present in about 3 to 5 per cent. of normal healthy adults. Many patients continue to pass albumin for very many years after an attack of acute nephritis, and yet functional tests prove that no evidence of nephritis is present. Whether albuminuria following acute nephritis is or is not associated with progressive kidney disease can always be settled by the use of modern functional tests. If any casual specimen of urine contains 2 to 2.5 per cent. urea or over there is very little the matter with the kidneys.

Many of the functional tests employed are not very difficult to carry out, yet they demand a certain amount of manipulative skill. Estimation of the amount of urea in urine, however, is an extremely simple process which can be carried out by anyone in a few minutes, and gives more information in general renal conditions than any other test at present employed. Instead of relying on albuminuria as an index of renal disease, the medical practitioner should get into the way of relying on urea concentration.

The Value of Modern Laboratory Methods to the General Practitioner.

By SIR FREDERICK W. ANDREWES, M.D.,

F.R.C.P., F.R.S.

(*Practitioner*, Jan. 1926, p. 17.)

CLINICAL pathology is growing yearly in its scope. Every large hospital has long been compelled to possess and equip clinical laboratories manned by trained workers in histology, hæmatology, bacteriology, and biochemistry. There are doubtless many of the older school who received their training in the days before clinical pathology was thought of who get along without it, trusting as they were taught to do, in their own clinical acumen and common sense. But the man of modern training, who has realized during his hospital career how much help pathological methods can afford in suitable cases, feels the want of them acutely in many a doubtful or difficult case.

A few men with a natural inclination for laboratory work become their own clinical pathologists. Many pathological examinations such as the staining of sputa, the examination of throat swabs for the diphtheria bacillus, and the Wassermann reaction, can be carried out quite well through the post provided that the practitioner is capable of furnishing suitable material. There are other investigations, such as the more elaborate blood examinations, in which postal transmission is unsatisfactory and really reliable results difficult to attain. Here, if the pathologist cannot be brought to the patient, the patient must be taken to the pathologist. The practitioner should understand the limitations of "pathology by post." There is the danger that it may degenerate into a "penny-in-the-slot" affair, in which the practitioner pays a small fee and expects his diagnosis by return of post. To a conscientious pathologist, lack of full details may be a serious handicap in the interpretation of the findings and he may not get from the examination all the help it might have been capable of affording. The practitioner should be so trained as to appreciate the help that clinical pathology can give. He should have been taught how to collect and transmit through the post the material required for pathological examination. He should know how to obtain a proper sample of sputum, free from buccal secretions; he should be able to take a faucial or pharyngeal swab, to take a syringe of blood from a vein, and to do a lumbar puncture; he should know in what fixing solution a portion of tumour should be placed on removal from the body. He should know, and trust, a pathologist whom he can take into his confidence. He should set forth a brief statement of the case and of the problem in which he requires help, with details of the nature of the material sent, and how and when it was obtained.

So valuable have modern laboratory methods proved, that the clinician, and perhaps especially the general practitioner, may be tempted to place too much reliance upon the pathologist.

Clinical pathology by post is one thing and treatment by post is quite another. It cannot too strongly be insisted that the results of laboratory methods, often carried out without actual contact with the patient, must be kept in due perspective as factors only, though often very essential ones, in the full review of the facts concerning any particular case. They can never replace, for example, the thorough physical examination of the patient of which the principles have been handed down to us by precept and example as the result of long clinical experience.

Skin Reactions in Asthma, etc.

By JOHN FREEMAN, M.D.

(*Practitioner*, Jan. 1926, p. 73.)

THE following is a list of protein idiopathies:—asthma, paroxysmal rhinitis, such as hay fever; animal

sensitiveness, such as horse asthma; food sensitiveness, such as egg-sickness; urticaria; eczema; ichthyosis; migraine-headaches; epilepsy; angio-neurotic œdema; paroxysmal arthritis, colitis or nephritis; etc.

All these are characterised by a specific sensitiveness to one or more foreign proteins.

Most of these protein sensitivenesses can *not* be tested for successfully, and many when detected are insignificant.

The skin-reaction is tested as follows:—If any cleaning of the skin is considered necessary, soap and water are preferable to an antiseptic. With any sharp sterile instrument, scratch through the superficial dead layer of the skin till the red cutis vera is laid bare, but avoid drawing blood.

A series of small areas, two to three millimetres square, must be scratched in this way, the number being at least one more than the number of tests to be made. The different protein reagents are then brought into intimate contact with the cutis vera on the different sites, one site being left untouched as a control. If the re-agent is a fluid, it is sufficient to drop it on the scratched area; if it is a dry solid, it may be rubbed into the scratches with any blunt instrument or dissolved in a slightly alkaline saline solution, and so dropped on to the scratch. If the protein is caught and dried on filter paper it may be stuck on to the scratched area with a drop of alkaline saline.

After the protein reagents have been in contact with the tissues for about five minutes, the scratched areas should be cleared up wherever necessary with swabs of wool and a little water, removing any blood, traces of reagents, paper, etc., which might obscure the reaction. This usually begins in about seven minutes with an erythematous blush, which surrounds the scratched area; following this an urticarial wheal starting at the scratch, but spreading beyond it into the surrounding skin. The reaction is at its height in fifteen or twenty minutes, and is usually fading rapidly in half an hour. We take as a positive reaction either a definite erythematous blush, or a definite urticarial wheal, or, better still, both of these together.

Occasionally the patient can tell you straight away that he has e.g. hay fever, horse asthma, egg-sickness, etc., and it is only necessary to confirm this by a direct test with, in these instances grass pollen, horse dandruff, and white of egg, respectively. Frequently, however, the patient can give no direct help, and it is highly necessary to get a clear idea as to what proteins to test for by thorough preliminary cross-questioning.

The reagents should be chemically identical with the foreign substances which are causing the symptoms in the patients; these various animal and vegetable substances need no preparation to make them produce a skin reaction.

A general practitioner had better begin by investigating in a small way with reagents culled from the kitchen or the world at large; frequently, almost usually, reactions obtained in this way are more definite and easier to read than reactions obtained with substances bought from a wholesale chemist.

If no reaction is obtained, this may be because the person is not sensitive to that particular reagent; but there may be other explanations. The reagent may have been spoilt in preparation; or it may belong to a group of proteins which give only slight or very doubtful reactions, e.g., the bacteria, moulds, and fungi in general.

If a positive reaction is obtained under suitable controls then the patient is sensitive to that particular protein, but this sensitization may be quite, or comparatively, unimportant as the cause of his illness.

Even after a dozen positive reactions have been obtained, there may yet be other and more important sensitizations which have not been detected or suspected. For example, it is no good to tell a man that his persistent asthma, urticaria, etc., is caused by eating bananas, tomatoes, or lobster, when the man has suspected and persistently avoided such food for years. It is useless to ascribe a rhinorrhœa in mid-winter to hay fever,

merely because the patient shows a positive dermal reaction to the pollen of the grasses.

Here the significance is merely that the patient is liable to random protein sensitiveness, and the important ones may be not easily tested for, e.g. microbic.

Skin Reactions in Diphtheria, Scarlet Fever, and Tuberculosis.

By A. B. PORTEOUS, M.D., B.S., D.P.H.

(*Practitioner*, Jan. 1926, p. 79.)

THE Schick test consists in inoculating into the skin of the subject a small measured dose of toxin, and observing what, if any, local reaction occurs. If no local reaction is produced, it is argued that the injected toxin has been neutralized by the patient's serum, and that the serum contains antitoxin, the amount of antitoxin being measurable by the amount of toxin injected.

The toxin is a six-day culture in sugar-free broth, filtered and allowed to stand 18 months to stabilize. The minimal lethal dose (m.l.d.) is estimated in the usual way. When required for the test a dilution is made so that one-fiftieth m.l.d. is contained in 0.2 c.c. This diluted toxin must be used fresh, as it is not reliable after twenty-four hours. A part of the diluted toxin is heated to 70°C. for five minutes, and is used as a control. In the test, 0.2 c.c. is injected very carefully intradermally, using an inoculation syringe with a fine needle. The control test is carried out on the corresponding spot on the other arm. A second syringe is used for this, and 0.2 c.c. of the heated toxin is injected here.

In positive cases the control arm is normal but on the test arm, after twenty-four to thirty-six hours, a red flush begins to appear. It is half to one inch in diameter, and is at its maximum in four days, gradually fading into a brown discolouration on which small scales may appear. Pigmentation may remain for weeks. Occasionally the positive reaction does not appear until the third day.

The negative and pseudo-reaction is a red flush with dark centre, less circumscribed than the positive reaction. It develops rapidly in twenty-four hours, and is equal on both arms. It has mostly faded by the fourth day, and may leave behind pigmentation with a certain amount of desquamation.

Positive and pseudo-reaction (combined).—The pseudo effect develops a red flush with deeper centre on both arms, and as this fades the positive emerges on the test arm as a much larger flush with a dark centre, which goes on to pigmentation and desquamation. The control reaction has meanwhile faded. The readings are most distinctive between the fourth and seventh days. The combined reaction is comparatively uncommon.

The patient is *immune* if the reaction is negative or negative and pseudo.

The patient is *susceptible* if the reaction is positive or combined.

Reviews.

THE PURPOSE OF EDUCATION.—By St. George Lane Fox Pitt. Fifth Issue, 1925. Cambridge University Press. Pp. 94. Price, 4s.

THIS thoughtful and scholarly book is one which should be read by all teachers and educationalists. Modern education, claims the author, is faulty in many of its directions, in both its aims and methods. We set out to teach school-boys or university undergraduates with an idea that we must make them practical persons, able to earn their livelihood. Hence our aims become purely materialistic; a fierce competition sets in, through

which indeed it is true that knowledge, skill and efficiency are to some extent acquired; but, with them, a permanent mental attitude towards life which is deplorable. Money becomes the world-ideal; competition the order of the day; and egoism the sole ideal of both men and nations, with the disastrous results of the great world war of 1914-1918.

The purpose of true education is not this at all. We may admit that the economic side of life is very important, but it is not all-important. It is the purpose of true education to develop personality, to foster high ideals, to lay stress upon the inter-dependence of one individual upon another, to develop character. It is not enough that a teacher should be clever and learned; a teacher can inspire in a pupil the love of learning for its own sake, only if he possesses it himself. The suppression of egoism and not its development should be the aim of education of the young. The teacher "should learn how and why beliefs, wishes and memories are related to one another, why they fluctuate, mingle and conflict. He should learn how and why our outlook upon life is so narrow and superficial; above all he should learn to know the true remedy for this pettiness, and he should love to apply that remedy." The belief that "we were meant to be happy," irrespective of all evidence to the contrary, is a delusion deeply implanted in our natures. In practice this delusion takes the form of insisting that we have a prescriptive right to the gratification of all our ephemeral wants. The truth is that, instead of postulating that we were meant to be happy, it should be the purpose of education to teach the student wherein true happiness lies and how to attain it. The man who is best educated is he who is of most service to his fellows. The alternatives are between the continuance of our present-day erroneous views as to the all-importance of money, with life governed by the morals of the jungle; and a realisation and inculcation of higher ideals and of nobler motives.

The matter is not unimportant. The development of personality and character in his students should be the aim of every sound teacher. And he will find in this admirable little book a most thoughtful contribution to this most difficult problem of the day.

It only remains to add that the volume is admirably published and wonderfully cheap.

MODERN MEDICINE.—By Many Authors. Edited by the Late Sir William Osler, revised by Thomas McCrae, M.D. and Elmer H. Funk, M.D. Vol. II. Third Edition. Pp. 891. London: Henry Kimpton, 1926. (Sold in sets of six volumes and desk index, £12-12 net.)

THE second volume of the new edition of Osler and McCrae is of special interest to medical men in the tropics, dealing as it does, with most of the great tropical diseases such as malaria, kala-azar, dengue, amoebic dysentery, relapsing fever, heat stroke, beriberi, hookworm disease, filariasis, etc.

Like all books which are written by specialists, each chapter bears the stamp of its author and the value of the work depends chiefly on the selection of the writers. Amoebic dysentery is dealt with by Richard P. Strong who has brought together a vast amount of detailed information and has written one of the most complete accounts of the disease in existence. His references to the work done by Sir Leonard Rogers and others in India are very complete, so it is all the more remarkable that Rogers' name is nowhere mentioned in the paragraphs which deal with emetine.

Malaria is discussed by Charles F. Craig in a very satisfactory manner; an interesting point is that the author describes the parasite of quotidian æstivo-autumnal malaria as a definite subspecies; in this matter he accepts the views of the Italian workers. Neither the coloured plates nor the stated points of distinction are very convincing, the size of the parasite appears to be the differential feature which is most strongly emphasized.

Craig's views on treatment are in accordance with the experience of most Indian observers, the dangers of intramuscular injections are duly emphasized. The chapter on blackwater fever is by Stephens. It is concise and to the point; the known facts are stated and space is not wasted on discussion as to the causation of the hæmolytic.

Kala-azar is discussed by B. C. Crowell in five pages in which the author has condensed the most important features of the disease. Even the aldehyde test is correctly described, a very unusual and gratifying feature in a general text book. The work of Knowles, Napier and Smith on the transmission problem had not reached the author in time for inclusion, and it is interesting to note that bed bugs, fleas, flies and mosquitoes are the insects which are described as having been studied. It now seems almost incredible that the sandfly should have escaped suspicion so long.

The chapter on syphilis is by the late Sir William Osler, J. W. Churchman, and L. A. Conner, whose names are sufficient guarantees of excellence.

The relapsing fevers are described by John L. Todd whose name is prominently associated with the early work on the African type. The differences between the tick-borne and the louse-borne varieties would justify separate descriptions or at any rate a clear statement of the differences between them; from this account the student will find it difficult to form clear ideas on this important point.

Special interest attaches to the article on beriberi by Musgrave and Crowell; it is a pleasure to read so rational and broad minded an account of the disease in place of the complacent dogmatism which is served up in all the other accounts of beriberi which have appeared in the text books of the past ten years.

The problem is stated to be "baffling" and "far from solved." "How many entities are included under the term tropical neuritis has not been sufficiently studied—until this has been done, beriberi must remain a clinical diagnosis of widely diversified meaning."

The authors italicize the following:—"It is not so easy to be certain that the food deficiency neuritis is all there is to the disease or group of diseases called beriberi."

When it is remembered that Crowell is responsible for these words and that he also was one of the workers whose human experiments are constantly quoted as evidence that human beriberi has been proved to be caused by a deficient diet, there are grounds for hoping that the beriberi problem may again be opened for discussion.

The attitude of "those in authority" has been one of contempt for the mentality of the people who dared to doubt the orthodox views on beriberi.

The article on pellagra contains a statement of the views of Goldberger; these appear to commend themselves to the author, Dr. E. J. Wood. The description of the disease is clear and concise.

Other chapters of exceptional merit are those on rheumatic fever by Poynton, animal parasites by Stiles, scurvy by Robert Hutchinson and rickets by Still. Despite the variations in standards of excellence of the articles in this volume, the reviewer is of opinion that it contains the best modern account of the groups of diseases with which it deals, and if, as can confidently be expected, the remaining volumes are as good, Osler and McCrae will retain its position as the best work on modern medicine.

A TEXT-BOOK OF MEDICAL DIAGNOSIS.—By James M. Andrews, M.D., Ph.D., LL.D., and L. Napoleon Boston, A.M., M.D. Third Edition. London and Philadelphia: W. B. Saunders Company, Ltd. Pp. 1422, with 555 illustrations, 21 in colours. Price cloth, 55s. net.

This third edition has been brought up to date by the inclusion of information with regard to a large number of tests and methods which have come into use since 1914 when the second edition was issued.

The previous edition was found useful by a large number of medical men and in the revised form the book ought to be still more acceptable. In the fourteen hundred odd pages there is a vast amount of information on methods of diagnosis, the illustrations are numerous and instructive. As is usual in books of this kind some of the paragraphs which deal with tropical diseases are less satisfactory than those which deal with cosmopolitan diseases.

In spite of these minor defects the book as a whole will be found a very valuable work of reference to the general practitioner and even to the specialist in medicine.

PRINCIPLES OF HUMAN PHYSIOLOGY.—By Ernest H. Starling, C.M.G., F.R.S., M.D., Sc.D., F.R.C.P. Fourth Edition. London: J. & A. Churchill, 1926. Pp. 1074. With 570 illustrations. Price, 25s. net.

PROFESSOR STARLING's well known and popular book "Principles of Human Physiology" has been before the profession for many years. In no other book is the subject of human physiology dealt with more clearly and lucidly and more comprehensively than in this volume. The author says in the preface that rapid advances in all branches of physiology have necessitated extensive alterations in every chapter and some parts of the new 4th edition have been entirely rewritten. In spite of this the book has not increased in bulk. Most of the recent advances in medicine are intimately connected with the advances in physiology and a book like this is not only essential for junior and senior students but should also form part of the library of every medical man.

ALLERGY, ASTHMA, HAY FEVER, URTICARIA AND ALLIED MANIFESTATIONS OF REACTION.—By William W. Duke, Ph.B., M.D. St. Louis: The C. V. Mosby Co., 1925. Pp. 339. Price, \$5.50.

THIS book is intended by the author to give a simple and brief account of this important subject. The author's experience of the study of hypersensitiveness is almost entirely clinical and he has presented the subject from that view-point. In the first four chapters the author deals with the subject of experimental anaphylaxis and discusses the difference between the physiological reactions of different animals as the result of anaphylactic insult. In the subsequent four chapters serum sickness, bacterial allergy, natural hypersensitiveness of human beings and its relation to other diseases are discussed. A comprehensive botanical survey of pollen-bearing plants of Kansas City is found in Chapter X, with a large number of illustrations. After discussing a variety of things to which the individuals show sensitiveness, their contributory causes and the symptoms of the reaction produced, he passes on to specific diagnosis. In Chapter XV, methods of making skin tests and their interpretation are described, and the subsequent chapter deals with the specific and non-specific treatment of these conditions.

Part II of the book is devoted entirely to the reactions caused by physical agents such as light, heat, cold, mechanical irritation and the sensitiveness of the individual to these is discussed. The author has accumulated a large number of interesting facts obtained from his clinical experience which lend the book a considerable interest and make it well worth perusal by those interested in this subject. The bibliography at the end of the book gives references to a large number of papers bearing on the subject.

DIABETES MELLITUS AND ITS DIETETIC TREATMENT.—By B. D. Basu, Major, I.M.S. (ret'd.). Thirteenth Edition. Allahabad: The Panini Office, 1925. Pp. 94. Price, Rs. 2.

ALTHOUGH this book has undergone several editions and the author has deservedly won distinction by his numerous contributions to medicine, biology, history, and the sacred literature of India, we are greatly disappointed to see the 1925 edition of this book bereft

of all information regarding the marvellous modern development in the diagnosis and treatment of the disease. As in former editions he continues to describe methods of treatment, physical, medicinal and dietetic, many of which are obsolete and others not based on scientific proofs. In a book of 94 pages the learned author has thought fit to devote 15 lines only to insulin! We cannot recommend the book to our readers, but hope that the author will revise the book and make the next edition more up-to-date.

A PRACTICAL MEDICAL DICTIONARY.—By Thomas Lathrop Stedman, A.M., M.D. Eighth Edition. London: Baillière, Tindall & Cox, 1925. Pp. xii plus 1146. With 11 plates and over 400 figs. Price, 35s. net.

THIS beautiful volume is the eighth edition of a work which is well known to the whole English speaking medical world.

A large number of new titles have been introduced without adding greatly to the size of the book. On glancing at the pages it would seem impossible that any name of importance could have been overlooked, but even "Homer nods" and the reader is disappointed to find that some well known names in Indian medicine have been overlooked, such as *kurchi*, urea stibamine, etc. Apart from such omissions we have found the definitions to be satisfactory and complete. The book will be found to be a valuable addition to the physician's library.

THE EXTRA PHARMACOPEIA, VOL. II.—By W. H. Martindale, Ph.D., and W. W. Westcott, M.B. Eighteenth Edition. London: H. K. Lewis & Co., 1925. Pp. xiii plus 728. Price, 20s. net.

WE must apologize for the regrettable delay in reviewing this very valuable little book. The *Extra Pharmacopœia* is too well known to need any special recommendation. This eighteenth edition fully maintains the high standard of excellence which has been set by its predecessors, it has been brought up to date by the inclusion of references to all the work which has been done on drugs since the preparation of the previous edition.

The work is far more than a mere compilation, its editors have been in the forefront of research work on drugs: their own investigations have been incorporated and the work of others is dealt with in a critical manner. It is most regrettable that Dr. Wyn Westcott died while the book was being printed so that this is the last edition which will benefit by his experience and extensive knowledge. In less than 800 pages a remarkable amount of information has been condensed and it is not likely that the medical man will fail to obtain information of a reliable kind with regard to any drug or any method of treatment in which he desires information. It is a book which is essential to every practising physician.

FOOD AND HEALTH.—By Ruth Young, B.Sc., M.B., Ch.B. Lahore: Guran Ditta Mal Kapur at the Kapur Art Printing Works, 1925. Pp. 88.

THIS little volume of 88 pages tells all that the average person ought to know about food. The language for the most part is simple and free from technicalities.

The booklet is suitable for senior school children and for educated people in general.

BABIES.—By A. G. G. Thompson, M.A., M.D., D.P.H. London: Humphrey Milford, Oxford University Press, 1925. Pp. 32. Price, Re. 1.

THIS little brochure is an altogether admirable one for the expectant mother and mother. In simple language it deals with the ordinary problems of maternity from a non-technical standpoint. The expectant mother is counselled to consult her medical adviser twice during pregnancy; once within the first three months, to ward off such dangers as eclampsia, osteomalacia and the like; the second time towards the termination of

pregnancy, in order to ascertain that the presentation is likely to be normal and that everything is straightforward.

With regard to feeding of the infant, the author insists upon three-hourly feeds during the day, and none at night. The baby should always be awakened up to be fed during the day time. At two months of age the feeds should be given four-hourly; and it is important that at each feed only one breast should be emptied, and the other left to refill. At six months the first crust of wholemeal bread should be given. Dummy teats the author rightly condemns entirely.

Successive chapters deal with the bottle-fed baby, in which simple formulæ are given for citrated cow's milk; with washing and bathing the baby, special emphasis being laid on having everything ready beforehand, so as not to expose the infant to cold for too long; with clothing, where loose open clothing is advocated, and the use of two napkins, the first a thin one to fit tightly, the second a loose one to cover the first; and above all, with the necessity for fresh air and sunlight in abundance. Chapters on personal hygiene and the habits of babies are both excellent and full of practical instructions for the young mother.

The whole little brochure is exactly what should be in the hands of every mother and expectant mother. It is written in simple language, and full of information of practical value.

Annual Reports.

REPORT OF THE HEALTH OFFICER OF CALCUTTA. 1923. BY H. M. CRAKE, M.D., D.P.H. CALCUTTA: CORPORATION PRESS. 1925.

THE number of deaths registered during the year was 25,824, equivalent to a death rate of 28.5 per thousand calculated on the census population of 1921. This is a slight improvement on the returns for 1922 when 26,381 deaths occurred, the death rate being 29.1 per thousand. There has been a steady and uninterrupted fall in the death rate of the city for four years in succession, viz., from 42.2 per thousand in 1919 to 28.5 per thousand in 1923. Though still higher than in 1916-17, the years preceding the terrible epidemics of influenza, the death rate now corresponds very closely to the average rate recorded from 1910-1915.

Local variations in death rate.—The lowest rates were recorded in wards 16 and 17; these wards consist mostly of better class European houses. The highest rates are recorded for ward 19, Entally; ward 20, Beniapukur; ward 21, Ballygunge; and ward 24, Kidderpore.

The death rate amongst females is very much higher than amongst males, the rates are 38.8 and 23.6 respectively. The difference is much more marked in certain wards, for example in wards 14 and 8, Taltollah and Colootolla, the rate amongst females is more than double that amongst males.

Infantile mortality.—This is as usual very high. A slight increase is recorded since last year; this year's rate is 294 per thousand births registered. The difficulty about gauging the infantile death rate is that it is dependent not only on all the deaths being registered but on all the births being registered also; it is a much more difficult task to get the latter carried out. The infantile mortality was highest in ward 5; the population of this ward is almost entirely Hindu. In four out of the five other wards that show a high infantile mortality the population is almost entirely Moham-medan.

This high infantile death rate is due largely to poverty, with the consequent ill-feeding of expectant women, but at the same time bad housing, child marriage, the purdah system, disease and ignorance all combine to undermine their health. Although many premature

births result from the conditions noted above there is no doubt that a large percentage are due to syphilis. Making allowances for the fact that chronic malaria is an important factor in the causation of premature delivery, the large number of stillbirths is evidence of the widespread prevalence of venereal disease. More than half the deaths amongst infants occurred during the first month of life. The main causes of death were tetanus neonatorum, respiratory diseases and debility. Tetanus neonatorum, a disease which is entirely preventable and is caused by dirty midwifery, was responsible for 386 deaths. The comparative rarity of deaths from diarrhoeal diseases is noteworthy; this is due to the fact that almost all children are breast-fed and that it is only when they are taken off the breast that these conditions appear. The infantile death rate has increased appreciably amongst both Indian Christians and Anglo-Indians. Can this be due to increase in unemployment amongst these classes?

Birth rate.—There is a slight increase in the number of births that were registered during the year.

Plague.—There was a mild recrudescence of plague, to which the term epidemic can scarcely be applied; 77 deaths, or almost half the number recorded for 1922, occurred.

Cholera.—The epidemic of cholera is one of the mildest that has been recorded for some years, 914 or only 48 more deaths were recorded than during the year 1917.

Small-pox.—A comparatively localised outbreak occurred; only 157 deaths were recorded.

Influenza.—There has been a steady fall in the number of deaths recorded from influenza during the last five years; this year only 371 deaths are recorded.

Tuberculosis.—There has been a decided fall in the number of deaths recorded as from tuberculosis, which is very satisfactory in view of the fact that there had previously been a steady increase in the number of deaths recorded since the year 1917. On the other hand there has been a slight increase in the number of deaths from dysentery and enteric.

Malaria.—As diagnosis is not always to be relied upon it is better to consider deaths from malaria and from other fevers together. As one would expect, the two most rural wards show the highest rates, Ballygunge is the highest and ward 20, Beniapuker, is the next.

Respiratory diseases.—There is a slight increase this year in deaths from respiratory diseases. The suburban wards show the largest number of cases. One would expect that the poor bustee dweller, ill-clad and poorly fed, living in a damp mud-walled hut would be most susceptible. The highest rates occurred in the months of January and December.

Kala-azar.—The mortality from kala-azar, which has been increasing steadily for several years, shows a sudden and very marked rise this year. The number of deaths due to this cause is given as 501 or 0.55 per thousand. A very large number of the cases are imported, but making allowance for these, there seems to be little doubt that kala-azar is becoming more prevalent in Calcutta.

Dengue.—A severe and widespread epidemic of dengue spread through the city during the months of August, September and October. All classes of the community were affected, and it is estimated that 30 per cent. of the population were attacked. This means that there were about 300,000 cases. Only a few months before the onset of the epidemic the mosquito brigades were disbanded despite the protests of the Medical Officer of Health.

Epidemic Dropsy.—Four groups of cases of epidemic dropsy were reported during the year. These outbreaks were investigated by Lieutenant-Colonel Megaw at the School of Tropical Medicine. A conference was held at the School and certain conclusions with regard to this disease were arrived at; these are stated briefly below.

(1) Epidemic dropsy is undoubtedly caused by eating rice. It has never been known to occur amongst persons who do not eat rice.

(2) Recent experimental work at the Tropical School has shown that rice which has been stored for some time under certain conditions of temperature and moisture is attacked by a fungus or bacterium, and a toxin is formed which, when extracted and injected into animals, is capable of producing all the symptoms of the disease.

(3) The actual organism has not yet been isolated.

(4) It is not possible at this stage to assert that a particular sample of rice will cause epidemic dropsy without elaborate pharmacological tests on animals. That is to say the seizure and destruction of rice suspected of causing epidemic dropsy as unfit for human food is hardly practicable at this stage.

(5) On the first appearance of symptoms of the disease absolute stoppage of rice and a mixed diet rich in vitamins, e.g., fresh milk, eggs, ghee, butter, fresh vegetables, fish, meat, etc., not only prevents the further development of the disease but effects a perfect cure.

(6) As a preventive measure the use of freshly prepared rice is strongly recommended.

ANNUAL REPORT AND STATISTICS OF THE GOVERNMENT GENERAL HOSPITAL, MADRAS, FOR THE YEAR 1924. MADRAS: SUPDT., GOVT. PRESS, 1925. PRICE RS. 6.

The total number of persons treated in the out-patient department during the year was 62,050, of which nearly five thousand were Europeans; the average daily sick was 380. The total number of in-patients was 9,648; this is again an increase over last year. A steady increase in the number of non-Europeans treated in the hospital has occurred during the last six years.

The report of Lieutenant-Colonel Elwes, the 1st Physician, includes some interesting comments on cases which are given below:—

1. *A Case of Malaria simulating Tetanus.*—P., aged 40, was admitted on 1st September, 1924, with a history of fever on alternate days. Examination revealed a palpable spleen and benign tertian parasites in the blood. The patient was put on to purgatives, followed by quinine. On the third day he was found with trismus, stiffness of the neck, ptosis of the left eye and difficulty of swallowing; there was no spasm of any other muscles. The blood was again examined and parasites again detected. Complement fixation test for tetanus could not be done; Schick's test was negative. The patient was put on intravenous injections of quinine bihydrochloride grs. 10, and anti-tetanic serum 20 c.c. a day. This treatment was continued for 5 days; the tetanic symptoms disappeared, the serum was stopped and quinine continued by mouth. This must evidently have been a case of malarial toxin affecting the central nervous system, particularly the nuclei of fifth and seventh nerves and producing symptoms akin to tetanus.

2. *A Case of Encephalitis Lethargica developing in the Course of Broncho-Pneumonia.*—J., aged 19, student, admitted on 7th August, 1924, with a history of fever and cough for eight days. Examination revealed pneumonic patches in both lungs; the blood contained no parasite, but showed a polymorphonuclear leucocytosis; the patient was treated as a case of pneumonia.

Two days later the patient was found to be rather lethargic, answering questions very slowly; there was a certain amount of ptosis of both eyes and some rigidity of the limbs. Reflexes were elicited with difficulty. Ophthalmoscopic examination showed that the retina and discs were normal. Lumbar puncture was done but no fluid drawn out. The pneumonia was cured in a fortnight's time but the lethargic state persisted and the condition was diagnosed as encephalitis lethargica. The patient remained for a month more in the ward; the lethargic condition remaining stationary. Discharged on 21st September, 1924.

In this connection it may be mentioned that two other cases of encephalitis lethargica were treated in Colonel

Elwes' wards during the year; one from Coimbatore and one from Guntur. In both, the disease developed after an initial attack of fever lasting a fortnight. Treatment was of course unsatisfactory.

Undulant fever.—Another interesting case was one of undulant fever. The patient was a Forest Officer, aged 36, who was in the United Provinces for a short time some years back and states that he used goat's milk for a month in the forest. Fever developed in April, 1924, and the patient was first treated with quinine in the district as a case of malaria. Not improving, he came to the General Hospital in July 1924 and on admission he was found slightly anæmic, with enlarged spleen and high fever. The fever was found to be irregularly remittent in type. He gave a negative result to all the usual tests, and finally an agglutination test for *Micrococcus melitensis* was tried and a positive reaction of 1 in 1600 obtained. Culture of blood and urine did not reveal the organism. He developed sciatica twice in the course of four months, each time in a different leg. This case was still under treatment.

Kala-azar and Its Treatment.—Antimony tartrate is still the most satisfactory drug, according to Colonel Elwes, in the treatment of kala-azar. In a few cases 5 c.c. of a 2 per cent. solution were tried every other day instead of higher doses at longer intervals. These cases were not found to progress quite satisfactorily, so that the 5 c.c. method was given up, and higher doses given in all cases. In two cases which were found very resistant, sodium antimony tartrate was tried, and marked improvement resulted. In some of the advanced cases of kala-azar it was observed that the vein walls were degenerated and effusion of blood occurred into the surrounding tissues with the first injections of 2 per cent. solution of antimony tartrate. Such cases are now started with a 1 per cent. solution for the first few injections, substituting the stronger solution later on.

The great tendency of kala-azar cases to develop lung complaints with increasing doses of antimony tartrate is still the embarrassing feature of this treatment; the lung complaints being mainly broncho-pneumonia and lobar pneumonia; in one case pleurisy developed. The antimony treatment had to be temporarily stopped for a while in these cases. The patients were none the worse for these complications and the spleen diminished more rapidly subsequently.

Diabetes and Insulin.—Insulin has been tried in eight cases. As much as 120 units have been given in a day to a patient. Certainly it improves the condition of the patient: hyperglycæmia and glycosuria as well as ketone bodies disappeared; patients could take more carbohydrates, and their weight increased, but the improvement depended upon the continuance of insulin injections. When insulin was stopped or the quantity appreciably decreased, the symptoms reappeared. It is still in the trial stage and a definite opinion cannot be given now.

Some interesting cases were reported by the 2nd Physician, Major G. E. Malcomson, I.M.S. He reported two cases showing unusual clinical manifestations of a benign tertian malarial infection:—

An Indian male, aged about 35, was admitted for stiffness of, and inability to open the lower jaw. There was no fever for one or two days after admission, the temperature then taking on a sub-febrile course. Benign tertian parasites were then discovered and the masseter spasm was only relieved after the administration of quinine.

An Indian male, aged about 25, was found in a collapsed condition in a railway carriage with choleraic motions. He was admitted into the General Hospital almost moribund. As his temperature was found to be slightly raised and his spleen enlarged a blood film was taken; this was found to be teeming with benign tertian parasites. It was noticed that the conjunctivæ were slightly jaundiced before death.

Post-mortem.—All the organs were found to be stained with bile. The bladder contained dark-brown urine which spectroscopically showed bands for reduced

hæmatin and hæmoglobin but no bile or bile salts. The liver and spleen were much enlarged, weighing 76 and 30 ounces respectively. The former showed dilated intralobular capillary spaces and heavily pigmented Kupffer's cells; slight round celled infiltration in Glisson's capsule in the neighbourhood of the portal area but no increase of interstitial tissue.

The spleen showed dilated sinusoids with endothelial proliferation and pigmented phagocytic cells; increase of connective tissue was observed.

Microscopic examination of the intestines showed no abnormality; no parasites were observed in the intestinal capillaries.

Nine cases of tuberculosis of the lung were treated with Dr. Bruschetini's sera and vaccines kindly supplied by Signor Martirosi, the agent for these preparations in India. Of these, four were cases of open tuberculosis, of which two were apparently cured; five were closed tuberculosis of which four were apparently cured. All cases showed lung involvement by x-ray examination.

The following case is of interest as illustrating the permanent effects of lightning shock on the nervous system.

The patient, a Hindu student, aged 23 years, came to the hospital complaining of weakness of the legs following a lightning stroke some two years ago. He gave the following history:—He was standing with bare feet on a bare earth-floor (? stone floor) of a temple during a thunder-storm. The only clothing he had on at the time was a loin cloth. He states that his skin, his clothing and the ground were all dry at the time of accident. The roof of the temple was made of copper plates. This was struck by lightning but apparently not seriously damaged. He was struck at the same time and lost consciousness at once. He remained unconscious for three or four hours and was unable to speak for some three hours after regaining consciousness. On trying to stand up his knees gave way under him, and it was some six months before he was able to walk properly. A certain amount of weakness still persists. The right side of the body was partly burnt by the shock, for he now presents a diffused scar on the right shoulder and on the outer surface of the right thigh.

The patient is a well-built healthy looking man of 23. The motor power of his lower extremity is slightly diminished, that of the upper is apparently normal. Muscles of the face are unaffected.

Pupil and abdominal reflexes are normal; the elbow and biceps jerks are brisk on the right and apparently normal on the left. Knee and ankle jerks are exaggerated, more so on the right side. Plantar reflex is always extensor on the right side, on the left side variable.

Cutaneous sensations are all normal with the possible exception of slight impairment to heat and cold in the extremities. There is no nystagmus, no intention tremor, no marked ataxia, but Romberg's sign is distinctly present, the patient losing his balance at once.

Dr. M. R. Guruswami, the 4th Physician, reported the following cases:—

Post-encephalitic Parkinsonian Syndrome.—There were 5 cases under this group. Two only are given here in some detail.

A, Indian student, aged 23, male, was admitted on 23rd August 1924 for "inability to speak well and slowness of movements." In June 1920, he had a short fever for 3 days, characterised by diplopia and sleepiness—a sleep from which he could be temporarily roused with difficulty. He was treated for a few days at Vizagapatam Hospital and later had recourse to Ayurvedic treatment. He says he improved somewhat. A little later, he was unable to speak, or keep awake; his movements became sluggish, even mastication was found difficult. There was ptosis of both eyelids for a short time. After a month he began to recover slowly, though the improvement stopped at the condition found at the time of admission.

Condition at time of admission.—He had a mask-like expression, slightly parted lips with dribbling of saliva. Left facial muscles feebler in tone than the right; other

cranial nerves apparently not affected; neither strabismus, ptosis, nystagmus nor diplopia. Accommodation and light reflexes were sluggish; the grip was quite good; there was slight spasticity of the lower limbs but no tremors—intention or otherwise. The abdominal reflex was very marked. Babinski's sign and Romberg's sign were absent. Plantar and other superficial reflexes were exaggerated. Knee and ankle jerks were exaggerated. In short, defective speech, slow movements, dribbling of saliva, inability to walk well or keep the head erect while walking, coupled with an "ironed-out face" characterised the patient at the time of admission. The deviation from the picture of paralysis agitans is evident from the description given above and this deviation has been attributed by various writers—J. C. McKinley (1923), Goldstein (1922) and others to their finding in such cases diffuse toxic lesions not in the globus pallidus and other basal ganglia, but in the substantia nigra and in the nuclei and paths nearer the spinal cord than the globus pallidus itself.

"The question how the toxic matter arises will have to be investigated when more cases come in. Whether we are dealing with a toxin produced directly by the virus of epidemic encephalitis or whether the liver is primarily affected and liberates toxins which injure brain matter are questions for future investigation, with the aid of more advanced students than I have now. Why some patients develop these sequelæ, while others do not, whether there is anything peculiar in the constitution or brain of some that makes them more prone to develop these phenomena are interesting points to be considered by the maturer physicians.

The patient showed a distinct improvement on hexamine by the mouth as well as intravenously."

Another case.—S., aged 21, male, admitted on 8th March, 1924 for tremors and indistinct speech. The chief signs that he showed were fine tremors of fingers increased on attempting to use the hand, slurring speech, nystagmus, divergent squint, the pupil of the left eye dilated while that of the right eye was contracted, optic disc paler than normal with well-defined margins. There was no incoordination, and no Romberg's sign or Babinski's sign. The knee jerks were exaggerated.

He gave a history of continuous fever for one month in 1921. A day before the onset of fever squint was noticed and he was delirious for 10 days during that illness. Diplopia developed during the pyrexial period and tremors and slurring speech followed.

Spleno-medullary leucæmia.—S., aged 40, admitted on 28th June, 1924 for a tumour of the abdomen, numbness of feet, hands and mouth of 7 months' duration. The patient looked very anæmic, with spleen extending well below the level of the umbilicus. The history of his illness was interesting:—About 8 months prior to admission, he had a fall from the roof of a house and was unconscious for 5 minutes. He had severe pain in the lumbar region, of a gripping character, for about a week after that. Gradually it wore off under local treatment. A month later, he noticed for the first time a small, hard tumour under the costal margin and this had been steadily increasing in size. Occasionally he got slight fever, specially towards evening. The bowels were constipated and there was distress on taking food. His motions showed no helminthiasis.

Blood examination on 1st July 1924 showed R. B. C's. 2,137,500, hæmoglobin 44 per cent. and W. B. C's. 302,000. The differential count showed 15.4 per cent. myelocytes, 21 per cent. large mononuclears, 15.4 per cent. lymphocytes, and 2.1 per cent. eosinophiles. Nine megakaryoblasts and six normoblasts were also met with during this differential count.

Arsenic internally and x-ray exposures to the spleen were given with the result that on 3rd September 1924 when he was discharged he had 3,500,000 R. B. C's. and 30,000 W. B. C's.

"Globulin test.—Finding from last year's experience that liver puncture was somewhat risky, I tried to do without it in diagnosing kala-azar and had to depend (when the peripheral blood did not yield parasites) on

the ratio of R. B. C's. to W. B. C's., leucopenia and mononucleosis and the aldehyde test, put together. Incidentally I tried to find the value of the globulin test or Brahmachari's test by examining one hundred consecutive cases admitted into my wards. The result was very disappointing and I have concluded that this test is of no value as an aid to diagnosis. The reaction was positive not only in kala-azar, but also in such widely different diseases as capillary bronchitis, influenza, pernicious anæmia, nephritis, malaria, myocarditis, bacillary dysentery, biliary colic, cirrhosis of the liver, pneumonia, rat-bite fever, abdominal tuberculosis, and ankylostomiasis. At the same time I must state that amongst influenza cases three gave a positive and eight negative results; amongst malaria cases five gave a positive and six negative results, and amongst cases of cirrhosis of the liver two a positive and three negative results. A large number of cases suffering from other diseases gave negative results."

The Honorary Physician, N. Venkataswami, reported the following cases:—

"Angina pectoris due to malaria.—A patient was admitted on 5th February 1924 with a history of acute pain over the left side of the chest, radiating down the left arm to the tip of the little finger. The attacks were of irregular onset without any relation to undue exertion. The protracted and not very acute nature of the pain during the attack on admission made me label it 'pseudo-angina' which only meant that the cause was not known. A slight temperature of about 101° on certain evenings roused my curiosity to examine the blood when M. T. rings were found rather easily. The relief of pain experienced and the absence of the same after treatment with quinine made me infer that malaria might have been the cause of the angina pectoris.

Ascites probably caused by chronic bacillary dysentery.—I am inclined to believe that there are many cases of ascites, usually regarded as being caused by portal cirrhosis of the liver, which are really the result of chronic peritonitis secondary to bacillary dysentery. This view is based on the belief that cases of ascites due to cirrhosis of the liver do not survive many tapplings and from the fact that ascites apparently of the type due to alcoholic portal cirrhosis of the liver is found in many total abstainers from birth. A case of ascites was admitted into my wards on 16th June 1924 that did not give any history of alcohol. I had no reason to doubt that statement. A history of previous dysentery and a few previous tapplings of the abdomen was elicited. There was not the characteristic facies of ascites due to cirrhosis of the liver; neither did the abdomen fill up rapidly after he was tapped a few days after admission. I am inclined to believe that this is a case of chronic peritonitis due to the toxins of the dysentery bacilli. I was not able to follow this case up as the patient left the hospital soon after he was relieved by the tapping of the abdomen.

Urea stibamine in the treatment of kala-azar.—The drug has all the advantages over the antimony tartrates of sodium and potassium claimed for it except the claim for cure in one course of four injections. Perhaps I have not tried the drug sufficiently long to prove it. The question of cost is against its being freely used in a hospital. If the drug could really cure a patient in one course of four injections as claimed by its adherents, I should think it would be a decided advantage in spite of the costs as there would be a great saving in regard to the hospital stoppages."

The report of the 1st Surgeon, Lieut-Col. E. W. C. Bradfield, M.S., I.M.S., included an interesting analysis of cases of diseases of the stomach and duodenum operated upon during the last year.

"The fact that 530 patients suffering from ulceration of the stomach or duodenum were operated upon during the past three years by six surgeons with a total mortality of 11.5 per cent. in all cases is evidence that these diseases are very prevalent in South India. The statis-

tics of my own wards for the past year are as follows:—

inability to take any precautions about their diet would probably return with jejunal ulceration. Three patients

Diagnosis.	Number of patients.	Nature of operation.	Number.	Deaths.	Mortality per cent.
Duodenal ulcer	86	Gastroenterostomy	86	7	7.8%
Gastric ulcer	19	Do.	16	0	0
Cancer of stomach	5	Gastrectomy	3	1	25
Cancer of duodenum	1	Gastroenterostomy	4	0	0
Obstruction of duodenum	1	Cholecystenterostomy	1	0	0
Jejunal ulcer	3	Duodeno-jejunostomy	1	0	0
		Excision of ulcer	1	0	0
		Gastroenterostomy	1	0	0

Duodenal Ulcer.—The collected records of the above 86 cases of duodenal ulcer show that:—

1. The average age was 33, the oldest being 60, while two patients were only 18.

2. The average weight of these patients was 92 lbs. while five adults weighed under 65 lbs.

3. The average duration of symptoms was four years, the longest being 15 years and the shortest two months.

4. The appendix was inflamed in 21 patients and contained thread-worms in 40 (50 per cent.).

5. A second ulcer was present in 7 patients. Of these, five were on the lesser curvature of the stomach, one involved the pylorus, and one the duodenum.

6. One patient had a gall-stone with chronic cholecystitis and the operation successfully performed included cholecystectomy as well as a gastro-enterostomy.

The results of operation have been satisfactory considering the very feeble condition of many of these patients, especially those with advanced stenosis.

The causes of death in the 7 cases recorded have been as follows:—

(1) Shock. Three patients with severe stenosis, and poor operative risk.

(2) Pneumonia. One patient who died 18 days after operation with symptoms of pneumonia and gangrene of the lung; no post-mortem was allowed.

(3) Hæmorrhage. At operation early cirrhosis of the liver was noted. The patient had a fatal hæmatemesis on the 18th day after the operation. No post-mortem was allowed.

(4) Sepsis. A very mild sepsis which caused adhesions between the ileum and the scar of the anterior abdominal wall. The patient developed symptoms of intestinal obstruction on the 20th day but unfortunately refused any operative relief until he was in *extremis*.

(5) Hæmorrhage. This patient died 2 hours after operation with symptoms of collapse. Post-mortem; a small hæmorrhage was found in the abdomen due to a faulty ligature. The bleeding was not severe and his poor general condition and inability to stand any further shock largely accounted for the fatal results.

I believe that the universal use of the 'Fowler position' after these operations, by causing anæmia of the brain, may sometimes be partly responsible for disaster. Shock is really a poor explanation for a death occurring 36 hours after operation and where general emaciation, degenerate heart muscle and small atrophied liver are the only post-mortem findings. Recent work has suggested that the sitting up posture may be responsible for an acute dilatation of the stomach where the pull of the intestines and mesentery causes the superior mesenteric vessels to obstruct the last part of the duodenum. One of our patients who developed acute dilatation of the stomach six days after operation certainly seemed to suggest the correctness of this theory. Washing out the stomach had produced no relief and we decided to raise the foot of the bed as high as possible and to turn the patient over with face down. The result was extraordinary, for all the symptoms passed away within about five hours and did not recur.

In last year's report, it was predicted that a number of patients on account of their economic condition and

were seen during the year, two operated on elsewhere and one of our own patients. (Patients frequently resort to other surgeons when their symptoms recur). For one patient admitted in a moribund condition with acute dilatation of the stomach, nothing could be done. In another patient adhesions around a stenosed jejunal ulcer were so numerous that the ulcer itself could not be dealt with but a second gastro-enterostomy produced relief and improvement in the general condition. In the third patient excision of a jejunal ulcer which had perforated the transverse colon was necessary and has apparently produced a cure. In both patients operated upon, the original duodenal ulcer was completely healed, though stenosis remained but it did not appear feasible to undo the anastomosis.

Gastric Ulcer.—The percentage of ulcers involving the stomach is rather larger than usual. The mortality from partial gastrectomy is very high and it is not now attempted except in selected cases. One death from this operation was due to shock and the other, an emaciated patient, aged 30, died from volvulus of the intestines, which developed three days after the operation and when the patient's condition was too critical to allow of any relief. Two patients were noted as being probably cancerous and were too ill for more than a rapid short circuiting to be done, but left hospital with relief of all symptoms. One patient had a peculiar leather-bottle condition of the stomach. He also was too ill for more than a gastro-enterostomy but improved very rapidly after operation, a happy result probably aided by a course of anti-syphilitic treatment suggested by a strongly positive Wassermann reaction.

Cancer of stomach.—Five patients, one of whom was too ill to stand any operation. In three of these the diagnosis was proved by microscopic examination of enlarged glands.

Cancer of duodenum.—This patient was admitted to hospital with intense jaundice and a dilated gall-bladder. Exploration found a cauliflower growth at the ampulla of Vater and temporary relief of symptoms was obtained by a cholecystenterostomy.

Obstructed duodenum.—This patient had suffered from symptoms of dyspepsia for six years. Operation disclosed dilatation of the first part of the duodenum caused by enlarged, possibly tuberculous glands, at the root of the mesentery. Duodeno-jejunostomy produced complete relief.

TUBERCULOUS ABDOMEN.

Tuberculosis amongst cattle appears to be unknown in the Madras Presidency and although no bacteriological investigations have been made, it is more than probable that this absence of bovine tuberculosis influences the incidence and character of the disease in South India. Tuberculous diseases of bone and joints, though not so commonly seen as in European hospitals, pursue a much more intractable course and appear to be less amenable to non-operative forms of treatment. The economic problems of this country and the ignorance of people of the hospital class, are contributory factors, but multiple lesions appear to be more common and the surgical forms are more frequently complicated by the presence of lesions in the lungs.

In 1924, 205 patients were admitted to the General Hospital, Madras, for surgical forms of tuberculosis, or 2.1 per cent. of the total admissions. The sites of the disease were as follows:—

Abdomen	95
Lymphatic glands	39
Bones	35
Joints	28
Abscess (not classified)	3
Skin	2
Testis	1
Kidney	1
Larynx	1
Total	205

Abdominal tuberculosis (including enteritis 20) accounted for 95 of these patients or 0.97 per cent. of the total admissions to the hospital, a very much higher percentage than is found in European general hospitals for all ages, and a figure approximately to that of children's hospitals, where it generally averages from 0.05 to 2 per cent. of the total admissions.

The admissions to medical and surgical wards were as follows:—

Tuberculous peritonitis	55
Tuberculous enteritis	20
Tuberculous cæcum	20

I have endeavoured to estimate the value of surgical treatment in what is undoubtedly a common form of tuberculosis in South India by a study of the First Surgeon's operation registers of the General Hospital for the past six years. These researches only show the type of disease found and the immediate results of operation. The difficulty of tracing Indian patients is very great but some idea of the ultimate results can be obtained from my personal notes. Most of our enquiries remained unanswered. One patient, who replied some months after the notices had been sent, had been so alarmed at the receipt of a letter that he at once buried it and it was only opened when he considered a safe period had elapsed.

The results of operation have been as follows:—

	Total.	Mortality.
Tuberculous peritonitis	43	14*
Tuberculous cæcum		
Excision of cæcum	14	2
Ileocolostomy	6	0
Simple laparotomy	7	0
Cæcostomy	1	1

* 3 died within three months of leaving hospital.

I. TUBERCULOUS PERITONITIS.

1. *Ascitic Variety.*—Of three patients operated upon, one with extensive involvement in the pelvis died after two months. This variety in its true form is comparatively rare and not enough cases have been recorded to test the value of simple laparotomy, the usual treatment advocated. Operation when fluid in the abdomen has been diagnosed has generally revealed the presence of the numerous adhesions which characterise the next type and in which the results of operative interference are very poor.

2. *Fibrous and Adhesive Variety.*—Of 40 patients submitted to operation 11 died, a mortality of 27.5 per cent. Many of these patients were operated upon for acute complications. Perforation of tuberculous ulcers with resulting acute peritonitis accounts for four, with four deaths; intestinal obstruction 5, with 3 deaths; infected tuberculous abscess 4, with 3 deaths. In 6 patients enlarged tuberculous glands were a prominent feature and in two of these infection had taken place in a chronic abscess with fatal results.

The average age of the majority of these patients (22 out of 39) was between 20 and 30 years. In typical cases diagnosis is not difficult. Abdominal pain, sometimes with definite relation to taking food, and fever

are complained of, while a doughy, distended abdomen often with evidence of free fluid in the peritoneal cavity, sometimes with a tumour mass or with visible peristalsis due to chronic obstruction are signs which cannot be mistaken. In the early stages chronic dyspepsia resistant to treatment, sometimes with tenderness in the right abdomen may render diagnosis difficult, but the pain never has the relapsing character of a duodenal or gastric ulcer. A tumour mass may call for an exploratory laparotomy but the results immediate and remote with these patients are very poor.

II. TUBERCULOUS DISEASE OF THE CÆCUM.

Ileo-cæcal tuberculosis was described by Hartman (to whom we owe the best description of this disease) as a form of tuberculosis very amenable to operative interference and more common than is generally recognized. A record of 20 cases in one year is evidence that the disease is very common in South India, though it is probable that many of the patients who were not submitted to operation, were really extensive examples of fibrous peritonitis. The disease occurs in two forms, in both of which a mass is found in the right iliac fossa. The entero-peritoneal form is an ulcerative caseous tuberculosis not confined to the cæcum but attacking also the ileum and the appendix. The ileo-cæcal region becomes lost in a mass of adhesions, among which caseating cavities form and in the later stages pyo-stercoral fistulae are found. This variety may simulate an appendicitis and the signs are those of an enteritis, never of obstruction. The lungs are frequently involved. Actinomycosis has never been seen in South India but in other countries may produce similar symptoms. The hyper-plastic variety simulates a neoplasm in the right iliac fossa and after a very vague insidious onset, the symptoms are those of a chronic intestinal obstruction. Tuberculous foci are scanty, surrounded by a dense fibrous tissue mass and associated with other purely inflammatory lesions, as for example, dense sclero-adipose-thickening and the production of numerous polypi and vegetations in the mucous membrane. The disease in this variety is confined until late to the cæcum, the walls of which are converted into a hard, rigid mass associated often with very extreme stenosis. Ulcers are sometimes found in the ileum and a similar hyper-plastic condition may occur in other parts of the large intestine. The lymphatic glands are often markedly infected.

The disease, as we have seen it at operation, has had the characters of the hyper-plastic variety rather than of the ulcerating caseous entero-peritoneal form. There are a number of specimens of the disease preserved in the Medical College Museum, all of which show massive fibrous formation in the walls of the cæcum. Of 28 patients whose operations were recorded, six were too ill or too extensive to allow of more than an exploratory laparotomy and cannot be classified. Five appeared to have been entero-peritoneal in character, 17 were hyper-plastic, one of which involved the sigmoid flexure. An interesting point about all these patients is that the ages noted were from 25 to 35 except four, aged 43, 45, 9 and 17. This agrees with Hartman's description that the disease presents its maximum frequency between the ages of 20 and 40.

My own records suggest that the hyper-plastic variety is not so entirely confined to the cæcum as the original description would suggest and this is borne out by the brief notes of the other surgeons. The reason of course may be that our patients are seen at a later stage than in a more educated European community. In six patients the disease was entirely confined to the cæcum, in two there were scattered ulcers on the lower part of the ileum, and in two, in addition to ulcers on the ileum, there were a number of scattered miliary tubercles over the peritoneum of the small intestine. In the patient on whom a cæcostomy was done the tuberculous mass was entirely confined to the splenic flexure but on account of his poor general condition and the presence of a sub-acute obstruction, no radical treatment could be attempted. In only three of these eleven patients

was there obvious disease in the lungs. Col. Niblock reported one patient, entero-peritoneal variety, on whom a lateral anastomosis was completed with complete success. A further operation was performed by him on this patient some months after the original, and the tuberculous mass was found to be entirely healed, no evidence of tubercle remained.

Of my eleven patients, one cæcostomy died five days after the operation, another patient with extensive disease in the lungs died on the 5th day after an ileocolostomy. Of the remaining nine patients (excision of cæcum) seven left hospital with apparently an excellent result. All the nine patients were discharged from the hospital and we have been able to trace the after-history of five of them up to two years.

(1) Male, aged 35, tuberculous cæcum, entero-peritoneal. There were several scattered ulcers on the ileum and miliary tuberculous nodules on the peritoneum. Tuberculous infection present in both lungs. The chief signs were pain in the abdomen, chronic diarrhoea and a tumour in the right iliac fossa. *Operation:* excision of cæcum with lateral anastomosis. The patient developed a faecal fistula at the site of operation and was discharged with this still not healed. He died six months after operation as a result of general tuberculosis.

(2) Female, aged 38, had been treated at a sanatorium for tuberculosis of the lung with improvement. History of a hard, fixed mass in the right iliac fossa for several years. Lately she has been subject to attacks of pain, which commence 1½ hours after food and are relieved by vomiting.

Operation: excision of cæcum with lateral anastomosis of ileum to transverse colon. Hyper-plastic disease of the cæcum but the coil of the ileum in the pelvis was studded with tubercles and matted together. Pathologist's report says that the ileocaecal valve was stenosed to almost complete obstruction by hyper-plastic tuberculosis. Following the operation she had a broncho-pneumonia which caused considerable anxiety for some time but eventually cleared. A faecal fistula developed at the wound but this healed with careful dressing two months after the operation. This patient is still at the sanatorium, eighteen months after the operation. Her general condition is slowly improving but she still gets fever after over-exertion.

(3) Remaining cases: girl aged 20, man aged 45, and girl aged 18, with typical hyper-plastic tuberculosis. Two and a half, two, and one year after the operation, they each appear to be in excellent health and free from tuberculosis.

The treatment of these forms of ileocaecal tuberculosis should be surgical, and if seen at a reasonably early period, the results will be very satisfactory and the dangers of the patient developing further tuberculous lesions remote. Simple laparotomy is of course useless, and short circuiting, or ileocolostomy should be reserved for advanced degrees of the disease or for the entero-peritoneal variety, which presents many difficulties both on account of the adhesions in the abdomen, and the often extensive distributions of the tuberculous infection. Excision of the cæcum including any involved area of ileum or ascending colon is not a very difficult operation, and the divided ileum is joined either to the transverse colon or to the sigmoid loop. The average reported mortality from the operation varies from 12 to 25 per cent. and though we have had no mortality in our last seven operations, two of these patients developed very alarming symptoms of severe toxæmia and were acutely ill for 48 hours. Handling of the tuberculous mass probably accounted for this condition but recovery from the operation was otherwise very rapid and satisfactory. A two-stage operation does not appear to be necessary except for very feeble patients. Two of our patients developed faecal fistulae, an accident I attribute partly to the drainage employed, and which I now endeavour if possible to avoid.

Two other unusual forms of abdominal tuberculosis in the period under review are worthy of note here.

One patient with typical tuberculous ulcers in the upper part of the jejunum was operated upon under the mistaken diagnosis of duodenal ulcer. Another patient with symptoms mainly gastric was found to have a complete fibrous structure at the ileo-cæcal valve. No evidence of tuberculosis could be found and the patient made a complete recovery after excision of the cæcum. We have not been able to trace the further history of this patient but the condition, as in two similar cases reported by Hartman, may have been tuberculous in origin."

ANNUAL REPORT ON THE WORKING OF THE HOSPITALS, DISPENSARIES, JAIL HOSPITALS, AND THE REGISTRATION OF VITAL STATISTICS IN THE CENTRAL INDIA AGENCY FOR THE YEAR 1923 AND ON VACCINATION FOR 1923-24. CALCUTTA: GOVT. OF INDIA CENTRAL PUBLICATION BRANCH, 1925. PRICE RS. 6.

DURING the year one travelling dispensary was opened by the Bhopal State. Four other dispensaries have been opened in various States but as these do not appear in the statistical returns from their respective Durbars they are not included in this report. Thus the total number of hospitals and dispensaries in Central India, excluding those for which the returns have not been received, was 214 compared with 215 in the previous year; the apparent decrease is due to the fact that two other dispensaries that existed during the year were not included in the returns.

The number of patients treated during the year was 1,654,509 as against 1,579,696 of the previous year, i.e., an increase of 74,813. The in-patients number 20,035 compared with 20,826 of the previous year. The number of operations performed was 63,368 as compared with 59,554 of the previous year.

The prevailing diseases were the same as during the previous year; numbers recorded under the six principal headings were:—

Malaria	..	..	295,000
Eye diseases	..	..	263,518
Skin diseases	..	..	164,393
Disorders of the digestive system	..	..	139,656
Ulcers	..	..	115,559
Rheumatic affections	..	..	44,709

Both syphilis and tuberculosis showed a slight increase again this year.

Vaccination.—During the year 1923-24 the number of vaccinations done was 141,721 as against 146,396 done in the preceding twelve months. Of these 140,229 were primary and 1,492 were secondary. One hundred and sixty-five vaccinators were employed during the year. The lymph was obtained from various sources. The lymph prepared at Manpur was distributed as before at a comparatively small cost; it gave good results.

Epidemics.—The Central India Agency remained entirely free from cholera during the year 1922 but during 1923 there were 77 cases with 62 deaths reported. The largest number of cases occurred in April; 48 out of the 62 deaths occurred during this month.

On the other hand the plague incidence was reduced; during the year 584 cases were reported compared with 1,019 of the previous year. The death rate was, however, high, 510 deaths occurring during the year. The highest incidence occurred in March and April; all the deaths that occurred in Bundelkhand Agency occurred during this month.

Small-pox accounted for 62 deaths out of a total of 547 attacked.

Lunatics and lepers.—There has been an increasing demand for accommodation in the lunatic asylum in

Indore City but as this was limited by want of space the asylum has been moved to Banganga where a more suitable house was available.

There are three leper asylums; the average number of inmates in these three asylums is a total of 66.

Correspondence.

BACK NUMBERS OF THE INDIAN MEDICAL GAZETTE.

The Secretary of the Office International d'Hygiene Publique, 195 Boulevard St. German, (VIIe Arr.), Paris, has written to us asking whether any subscriber can supply him with the *Indian Medical Gazette* from August, 1920 to the end of 1925 inclusive.—EDITOR, I.M.G.

"THE DARLING PRIZE."

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to the events recorded in the enclosed copy of a note which appeared in the issue of *Nature* for 28th November 1925, I have been asked by the President of the Health Committee of the League of Nations to bring to the notice of British friends and fellow workers of the late Dr. S. T. Darling that a list has now been opened at Geneva for contributions to the capital fund to found "The Darling Prize." As it is probable that a large number of workers on subjects connected with tropical medicine and hygiene may wish to be associated with the Health Committee's plan for honouring Dr. Darling's memory, I would suggest that individual subscriptions should not exceed one guinea. Any one wishing to contribute should please forward his subscription to the Medical Director, Health Section, League of Nations, Geneva, who will acknowledge all sums received. Detailed regulations concerning the award of the Darling Prize will be drawn up as soon as the Health Committee can form an estimate of the sum likely to be available. All decisions on this subject will be at once communicated to subscribers. You will see that the Darling Prize is being treated apart from the proposed memorial to the late Dr. Lothian ("The Lothian Scholarship"). The latter memorial is being provided, not by private subscription, but by the organisation of the League of Nations of which he was a permanent member.—Yours, etc.,

G. S. BUCHANAN,

Senior Medical Officer,

Ministry of Health and British Member of
the Health Committee of the League
of Nations.

WHITEHALL, LONDON, S.W.1.
18th January 1926.

The following is the note from *Nature*:—

THE DARLING AND LOTHIAN FOUNDATIONS FOR RESEARCH IN MALARIA.

SOME months ago we had to record (*Nature*, May 27th, p. 845), with much regret, the deaths in a motor-car accident, near Beirut in Syria, of Dr. S. T. Darling (United States of America), Dr. N. V. C. Lothian (England), and Mlle. Besson (France), members of the Malaria Commission of the League of Nations who, with Prof. Nocht (Hamburg), Swellengrebel (Amsterdam), Ottolenghi (Italy), Anigstein (Poland) and Colonel James (England), were undertaking a tour of investigation in Palestine, Syria, and part of Turkish Asia Minor. In the recently published report on the work of the fifth session of the League's Health Committee, held at Geneva on October 8th to 14th, it is

announced that the Committee, wishing to honour and perpetuate the memory of Dr. Darling and Dr. Lothian, has decided:—

(1) To collect by private subscription a capital fund, the interest on which will be expended on a prize to be awarded periodically. This will be known as "The Darling Prize."

(2) The Prize (a medal or other reward) will be awarded by the Malaria Commission of the League of Nations to a scientific worker who, in its opinion, has carried out recent distinguished research on a subject connected with malaria which comes within the general scope of the Commission's investigations.

(3) To devote a portion of the credits provided for in the budget of the Health Organisation for the encouragement of malariological study to the establishment of a periodical scholarship to be known as "The Lothian Scholarship." This scholarship will be awarded by the Malaria Commission to a selected candidate whose course of study should be in conformity with the general programme of the Malaria Commission.

In our issue of August 8th, p. 216, we printed the substance of an appreciation, from the pen of Prof. R. W. Hegner, of the life and work of Dr. Darling. In the Malaria Commission's report of the Palestine tour, which preceded the journey to Syria on which the tragic accident occurred, it is said that the Commission had frequent occasion for congratulation that Dr. Darling had found it possible to be one of the party. "His previous experience of malarial epidemiology and anti-malarial operations in many countries was unrivalled. He appreciated very clearly the particular aspect of the subject with which the Commission's mandate is chiefly concerned, and his observations during the tour constantly proved that he was at the zenith of his powers as an expert adviser on antimalarial work."

Dr. Lothian joined the Secretariat of the Health Section of the League in May 1923, after a career of considerable achievement in the Royal Army Medical Corps. He had specialised in hygiene, and some of the scientific papers which he published during his army service were of outstanding merit and practical usefulness, notably his "Historical inquiry into the load carried by the soldier of various periods," in which he showed that a soldier should not be required to carry more than 33 per cent. of his own weight; the load of a mule is 32 per cent. and a horse 28 per cent., and to require a soldier to carry more than 33 per cent. is to destroy his marching power and capacity for battle."

Dr. Lothian, during his two years' service with the League, travelled in many countries and came into close contact with administrators and public health officers of many nationalities. He accompanied and guided the "interchange courses" of foreign public health and medical officers which, in collaboration with the Rockefeller Foundation, now form a regular item in the programme of the Health Organisation at Geneva. He was secretary to the League's Malaria Commission, and in the report of the Commission's tour of investigation through eastern Europe and Russia, which was published last year, the chapter entitled "Summarised Impressions of the Tour" was wholly drafted by him. It is a sufficient illustration of his expert knowledge of the subject and of the industry which characterised all his work. His high sense of duty and his attractive personality gained him the highest regard and respect wherever he went, and the shock of his death was the greater because he was in the exuberant vigour of youthful manhood, looking forward with enthusiasm to the highest and best that life holds in store.

B. COLI INFECTION IN THE PUERPERIUM.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I was very interested to read Dr. Buchia's article in the February number of the *Indian Medical*

Gazette, on page 73. The question I asked in the June number of 1925 was:—Is there a puerperal fever in which the bladder and urinary passages alone are infected, the uterus being normal and sterile? I believe I have seen two such cases in India. If the answer is, yes, then it is clearly a contingency for which obstetricians should watch, as it is probably both preventable and curable.—Yours, etc.,

G. T. WRENCH, M.D., B.S. (Lond.).

VICTORIA ROAD,
KARACHI,
20th February 1926.

GLYCOSURIA IN LEPROSY.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I read with interest the statement of P. S. Srinivasan in regard to glycosuria in leprosy. In my last year's work among lepers of all types I have not found it more common than among an equal number of ordinary dispensary patients, and then in all probability it was due to a coexisting diabetes mellitus. However it would seem possible that there could be a leprosy diabetes due to infiltration of the pancreas.

The results obtained by Dr. Srinivasan were obtained with Fehling's solution which is remarkably unreliable as a test for sugar, but like many other unreliable things it takes a long while before they are no longer used. Fehling's solution is not stable and besides a reaction with glucose it also reacts with conjugate glycuronates, uric acid, nucleoprotein, homogentisic acid, phosphates of the alkaline earths and with creatinine. Thus when positive reactions are obtained it is difficult to know to what they are due. The strong alkalinity of Fehling's solution has a tendency to destroy some sugar which if present in small amount may thus escape detection entirely.

The solution which we use and which we have introduced into Chandkuri Asylum is Benedict's. It detects smaller amounts of glucose, as little as 0.015 to 0.02 per cent., and it does not deteriorate on long standing. There is no troublesome mixing of solutions prior to use, it is always ready.

The test is very simple and the solution is made up as follows:—

Copper Sulphate	..	17.3 gms.
Sodium citrate	..	173. gms.
Sodium carbonate (anhydrous)	..	100 gms.
Distilled water	..	to 1000 mls.

The citrate and carbonate are dissolved by heat in 600 c.c. of water, filtered if necessary. The copper sulphate is dissolved in 100 c.c. water and made up to 150 c.c. The first solution is then placed in a jar or beaker and the copper solution slowly added while stirring constantly. The solution is now ready for use.

To apply the test:—

Five c.c. of Benedict's solution are placed in a test tube and to it are added exactly eight drops of the urine to be tested. Boil for one or two minutes and cool spontaneously. If glucose is present the solution will be filled with a red, yellow or green precipitate depending on the amount present. If none is present the solution remains clear with color unchanged. When one gets a positive test with this test he is sure that it is due to glucose.

It would be interesting if Dr. Srinivasan would check his findings by using Benedict's solution in place of Fehling's.—Yours, etc.,

MILTON C. LANG, M.D.,
Medical Superintendent,
Chandkuri Leper Asylum.

THE GENERAL PRACTITIONER AND MEDICAL RESEARCH.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Within recent years the idea is gaining ground amongst the general practitioners in India especially (with a few exceptions) that medical research is the special prerogative of a few isolated laboratory workers; and that the "g. p." has absolutely nothing to do with it. Some of them even go a step further and say that it would be presumptuous on the part of a general practitioner to talk of medical research. It is this idea, I think, that is mainly responsible for the present secession of general practitioners from medical research. It is a matter for regret that none of such medical men have ever considered the consequences of their actions. It is to correct this prevalent wrong notion that the following few lines are penned.

True it is that certain kinds of research call for the highly skilled specialist but the general practitioner can do a lot with his observant eyes. I think that he has to bear the lion's share of the burden. The specialist can work only through a particular line of action but multifarious are the lines of action for the general practitioner. He has greater opportunities for research than an isolated laboratory worker who depends for his clinical material upon his brothers, the "g. ps." It is only after they have by their accurate clinical observations separated a disease as a distinct entity from a host of other homologues that the laboratory worker begins to apply his weapons of refining and perfects the finding. Without the material how could the laboratory worker work? To put it in another way the general practitioner has to take the initiative, find out something new by his clinical observations and arrive at certain conclusions based upon all the observed facts; then his "specialist" brother comes to his assistance and with his delicate appliances investigates and either corroborates the findings of the clinician or proves that they require to be corrected or modified by further observations. Thus it is seen that the specialist and the general practitioner have to work in collaboration with each other, the one supplementing the other.

To give an instance of how a general practitioner can assist his brother "specialist":—he can observe the incidence of a particular disease in a particular region, or season or climate, its occurrence in relation to the environment—housing, food, water, air, or social conditions of life, its prevalence in a particular community or class, the different clinical manifestations of the same disease in different individuals at the same or different times or in different regions, or the constancy in the clinical manifestations of the disease whichever region or climate it occurs in, and can give suggestions as to the possibility of its being an infection, or an intoxication or an aberration of the metabolism, as may reasonably be inferred from the observed clinical data; and also suggestions as to the possibility of a particular channel of transmission, and the avenue which the specialist has to explore with his arms and ammunitions of laboratory apparatus and reagents.

The practitioner cannot even stop here. He has to follow his brother the "specialist" throughout his journey and cheer him up when he has to ascend the hills that may be on the way, or even suggest to him an alternative route, and finally when the formidable enemy has been caught to put the results of the hard labours of the specialist to the crucial test of clinical application and give his verdict.

He has to watch with patient eyes and try to assist his brother the specialist in the laboratory with fresher materials to work with. The general practitioner can no longer afford to shut his eyes and keep himself aloof from his brother the specialist. He has to come forward to bear his legitimate share of the burden.

Can the general practitioner himself take the initiative in research? Yes,—he can,—with wonderful results—

BAITALPUR, C. P.
VIA BHATAPARA, B. N. RY.
2nd March 1926.

if properly carried out. As an instance of what the observant eyes of the general practitioner can accomplish, I may point out "the magnificent work on heart disease" of the late Sir James Mackenzie, to quote Colonel Megaw. The field of the laboratory worker is limited, whereas that of the general practitioner is very wide.

The great father of medicine, Hippocrates had no microscope nor electric centrifuge, but marvellously enough he has bequeathed to us a wonderfully accurate clinical description of the diseases that decimate mankind; and he was able to separate and identify distinctly very closely allied diseases; for example, the three types of malarial fevers were clearly identified by him and the group of malarial fevers separated from a host of other similar fevers at a time when he had not even the advantage of such common clinical appliances as we now possess. This bears eloquent testimony to what can be accomplished by the observant eyes of the general practitioner. Many more instances could be cited, but one is as good as many. Thus it is clearly seen that the "g. p." has played a very prominent part in the past history of medical research.

In countries other than India the "g. p.'s" continue to follow in the footsteps of their glorious predecessors. Will the "g. p." in India now at least try to shake off his present indifference and ignorant prejudice towards research and come forward to associate himself in increasing degrees with his brother "specialist" who has been manfully waging war single-handed with the formidable opponent disease?

Brother "g. p.'s", please consider well and come forward.—Yours, etc.,

G. R. RAO.

CALCUTTA,
Dated 19th January 1926.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Colonel A. N. Fleming, D.S.O., M.B., F.R.C.S., I.M.S., to be Honorary Surgeon to the King, Indian Military Forces, *vice* Colonel P. Dee, M.B., I.M.S., (retired). 9th June 1925.

The services of Colonel R. A. Needham, C.I.E., D.S.O., I.M.S., Officer on special duty with the Railway Department (Railway Board) are replaced at the disposal of the Department of Education, Health and Lands, with effect from the afternoon of the 27th March 1926.

Major G. M. Millar, O.B.E., I.M.S., an Agency Surgeon, on return from leave, is posted as Residency Surgeon, Mewar, with effect from the 2nd March 1926.

The services of Major V. Mahadevan, F.R.C.S.E., I.M.S., are placed permanently at the disposal of the Government of Madras, with effect from the 4th September 1925.

Major H. W. Acton, I.M.S., Professor of Tropical Pathology and Bacteriology, School of Tropical Medicine and Hygiene, Calcutta, is appointed to act, in addition to his own duties, as Director of the said institution, *vice* Lieutenant-Colonel J. W. D. Megaw, C.I.E., M.B., I.M.S., V.H.S., granted leave.

Major W. O. Walker, F.R.C.S.E., I.M.S., Civil Surgeon of Serampore, is appointed to act, in addition to his own duties, as Civil Surgeon of Hooghly, during the absence, on leave, of Lieutenant-Colonel C. A. Godson, I.M.S.

On return from leave, Major C. R. O'Brien, M.B., I.M.S., Civil Surgeon, is posted to Dacca, *vice* Lieutenant-Colonel M. Mackelvie, C.I.E., M.B., F.R.C.S.E., I.M.S., granted leave.

Major J. D. Sandes, M.B., F.R.C.P.I., I.M.S., officiating Professor of Medicine, Medical College, Calcutta, and First Physician, College Hospital, is appointed to act as Principal of the said institution, with effect from the 16th April 1926, *vice* Lieutenant-Colonel F. A. F. Barnardo, C.I.E., C.B.E., M.B., F.R.C.S.E., I.M.S., granted leave.

The services of the undermentioned officers are placed permanently at the disposal of the Government of Burma, with effect from the dates shewn against their names:—

Captain H. Aung Khin, I.M.S., 2nd August 1922.

Major A. L. Sheppard, I.M.S., 22nd December 1922.

Captain L. S. Modi, I.M.S., Superintendent of the Buxar Central Jail, is appointed temporarily to be the Superintendent of the Bhagalpur Central Jail during the absence, on leave, of Captain U. J. Bourke, I.M.S., or until further orders.

LEAVE.

The Hon'ble Major-General Sir Charles MacWatt, Kt., C.I.E., K.H.S., I.M.S., Director-General, Indian Medical Service, is granted leave on average pay for six months with effect from the 1st April 1926.

Lieutenant-Colonel J. W. D. Megaw, C.I.E., M.B., I.M.S., V.H.S., Director, School of Tropical Medicine and Hygiene, Calcutta, is allowed leave on average pay for four months, under articles 81 (b) (i) and 82 (b) of the Fundamental Rules, with effect from the 15th July 1926.

Lieutenant-Colonel C. A. Godson, M.C., I.M.S., Civil Surgeon, Hooghly, is allowed leave on average pay for eight months, under article 81 (b) (i) of the Fundamental Rules, with effect from the 12th May 1926, or any subsequent date on which he may avail himself of the leave.

Lieutenant-Colonel M. Mackelvie, C.I.E., M.B., F.R.C.S.E., I.M.S., Civil Surgeon, Dacca, is allowed leave on average pay for eight months, under article 81 (b) (i) of the Fundamental Rules, with effect from the 15th May 1926, or from any subsequent date on which he may be relieved of his duties.

Major L. A. P. Anderson, I.M.S., Officiating Assistant Director, Central Research Institute, Kasauli, is granted leave on average pay for 8 months combined with leave on half average pay for 3 months and 10 days and study leave for 8 months and 20 days, with effect from the 5th April 1926, or such subsequent date as he may avail himself of the leave.

Captain G. Shanks, M.D., I.M.S., Professor of Pathology, Medical College, Calcutta, and Bacteriologist to the Government of Bengal, is allowed combined leave for one year, viz., leave on average pay for eight months under article 81 (b) (i) of the Fundamental Rules, and study leave for four months under rules 1, 2 and 6 of the Study Leave rules for the Indian Medical Service officers, with effect from the 22nd October 1926.

PROMOTIONS.

Majors to be Lieutenant-Colonels.

K. G. Gharpurey, D. C. V. FitzGerald, M.C., B. Higham, M.B., S. T. Crump, J. M. Skinner. —Dated 1st February 1926.

C. R. O'Brien, M.B. Dated 1st March 1926.

Captains to be Majors.

K. R. Rao, H. Chand, M.C., N. D. Puri, M.B., M. Das, M.C., M.B., J. B. Vaidya, J. M. R. Hennessy, C. H. N. Bakar, M.C. —Dated 31st January 1926.

M. L. Treston, F.R.C.S., A. Chand, M.B., R. Lee, M.B., C. de C. Martin. —Dated 1st February 1926.

RETIREMENTS.

The King has approved the retirement from service of Lieutenant-Colonel C. M. Mathew, I.M.S., from 2nd November 1920.

The King has approved the retirement from service of the following officers, with effect from the dates specified:—

Lieutenant-Colonel R. F. Standage, C.I.E., F.R.C.S., I.M.S. 28th January 1926.

Lieutenant-Colonel W. Gillitt, C.I.E., M.D., I.M.S. 16th February 1926.

NOTES.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.

(Division of Tropical Medicine and Hygiene.)

EXAMINATION RESULT. 79TH SESSION. OCTOBER 1925—FEBRUARY 1926.

Passed with Distinction:—

R. M. Morris—Winner of "Duncan" Medal.
W. A. Young.
H. L. Batra.

T. Y. Li.
T. P. Noble.
A. K. El Shurbagi.
M. A. H. Attia.
J. C. Pyper.
A. G. Taylor.
H. B. Boucher.

Passed:—

E. C. Chitty.	B. E. Khoo.
C. S. Mence Chataway.	J. D. L. Perera.
W. H. Watson.	K. W. Todd.
J. H. H. Chataway.	E. Burke.
A. K. Abdel-Khalik.	H. W. Braxington.
S. C. Gomes.	D. W. G. Faris.
B. N. V. Bailey.	R. McFiggans.
F. G. Greenwood.	M. Rustomjee.
H. Mostert.	J. J. O'Grady.
E. A. Penny.	C. M. Churcher.
E. E. Claxton.	Sherwood Hall.
L. M. Jacobs.	J. J. Keevil.
L. G. W. Ulrich.	G. D. Gordon.
E. K. Will.	C. S. Wylde.
E. Struthers.	T. V. FitzPatrick.
M. B. Hall.	Y. N. Lal.
M. Holliday.	W. L. Gopsill.
B. E. M. Newland.	C. R. Subryan.
M. A. H. Azim.	T. James.
A. S. M. Douglas.	R. A. Heatley.
R. D. Reid.	R. Huey.
D. Bell.	V. F. Dougherty.
P. Ross.	P. L. Gray.
I. J. Woodhouse.	

17th Feb. 1926.

HÆMOSTYL, ROUSSEL.

An interesting new preparation is Hæmostyl, Roussel. This is an activated horse serum for the treatment of hæmorrhagic states and of anæmias of all grades. In 1906 Carnot and Deflandre discovered that in a healthy vigorous animal blood-letting induces an intense tissue reaction followed by a marked blood regeneration; further that the tissue reaction is due to an active substance present in the serum, which is destroyed at 55°C. This substance they termed "hæmopoietine," and if a serum rich in this substance be introduced into another animal deficient in blood cells, a very rapid hæmopoietic reaction occurs.

In preparing Hæmostyl, Roussel, young healthy horses are first selected, and a first copious bleeding resorted to. After this the animal reacts and the blood is drawn off at the moment when the hæmopoietic reaction is most intense, as measured by blood counts. The serum

is sterilised by five heatings to 55°C. It is this serum which constitutes Hæmostyl.

This serum is indicated in all hæmorrhagic states, such as post-partum hæmorrhage; secondly, in anæmias of all-classes; thirdly, in chronic infectious diseases associated with anæmia, such as relapsing malaria, sprue, tuberculosis and the like. It is put up in ampoules for subcutaneous administration, or for rectal injection; as Hæmostyl-Syrup for oral administration, and as desiccated Hæmostyl tablets for oral administration. Published reports bear witness to its value in the anæmia of tuberculosis, in hæmoptysis, as a local dressing in burns and ulcers, and in hæmatemesis. The manufacturers especially insist on its value by oral administration. They are J. B. Fialip, 21 Rue d'Aumale, Paris.

"PANCREPATINE, A. F. D."

An interesting preparation recently put upon the market by the Anglo-French Drug Co. (Eastern), P. O. Box 460, Yusuf Building, Church Gate Street, Bombay is "Pancrepatine." This is a combination of an extract from the pancreas with a hepatic extract, put up in gluten-coated globules for oral administration, and has been highly spoken of by writers in the French medical journals. Whereas insulin is a drug the use of which in diabetes must necessarily be confined to cases under strict medical supervision, it is claimed that Pancrepatine can be taken by the patient without special supervision. For an adult diabetic the course advocated is to begin with 6 globules taken daily with meals, and increase to 12, at which dosage 4 capsules are taken t.d.s. with food until the urine becomes sugar-free. The diet must be reduced to a total carbohydrate intake of 70 to 80 grammes, but can subsequently be gradually increased.

A second new preparation by the same firm is their "Benzo-bismuth", referred to on p. 214 of this issue. In general there now appears to be a tendency to return to the injection of soluble, rather than of insoluble, bismuth compounds in the treatment of syphilis and frambæsia. It is claimed for Benzo-bismuth that it is very stable, it contains 20 per cent. of bismuth, there is no fear of its being retained in the tissues as with insoluble preparations, therapeutic results are very good, whilst administration is very simple and free from all risks.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

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The Editors of the *Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

Original Articles.

MEDICAL ASPECTS OF LIFE INSURANCE IN INDIA, WITH SPECIAL REFERENCE TO CALCUTTA.

By EDWARD HOUSEMAN, M.A., M.D., B.C.,
D.P.H. (Cantab.)

Chief Medical Officer in India to The Commercial Union Assurance Co., and The Phoenix Assurance Co.

IN writing on life insurance in India, one finds that there is a great scarcity of books of reference and also that the only vital statistics of any real value are those which relate to the Presidency towns.

In the districts a very small percentage of fatal illnesses are seen and diagnosed by qualified medical men and the mortality statistics for the general civil population are usually returned by uneducated village watchmen, so they are of little value.

For these reasons my investigations have been confined principally to Calcutta, which city, though no longer the official capital of India, may I think, still claim to be the commercial capital. Most of the insurance companies, which operate in India have their head offices in Calcutta, and consequently the major portion of the insurance work done in the peninsula is referred to this city.

The duties of an insurance medical officer in India are very similar to those of his colleague in Europe, but I think the Eastern examiner has the greater difficulty in presenting an accurate report to his company.

Proposers in all parts of the world when asked to record their past illnesses have short memories and in this respect the oriental may be regarded as an expert, so much so that it is unusual for an examiner to find any proposer, no matter what his age may be, to have suffered from any illness more serious than a slight attack of fever. In consequence the examiner usually has to conduct an elaborate cross-examination before he can hope to approach the truth, and in doing so he speedily learns to pay more attention to the way answers are given than to what the actual answers are.

Some of this inaccuracy is often unintentional, but in many cases it is deliberate and not infrequently proposers are coached by their agents before they come up for examination, so that they shall not make statements which may adversely influence the examiner. In these days of keen competition to secure new insurances, proposers, when rejected by one office, are often persuaded to try and effect an insurance with a second one, in which they are sometimes successful and manage to get themselves accepted at ordinary rates by the second office.

From this it will be seen that the standard required by different companies varies consider-

ably, many seem to be rather too severe and this applies more especially to some of the Home companies, who are rather afraid of Indian risks and often do not readily accept the opinion of either their local representatives or their medical examiners. On the other hand some companies are very easily satisfied and are content with a medical examination which is of little value. On one occasion recently a friend of mine wished to take out a policy with a company having a large Indian business. He is a man about six feet and many stones over the maximum weight for his height. The examiner looked at him and promptly said such a big man must be a first class life, so my friend was accepted as a first class life after a very superficial examination.

In another case it was discovered in the office of a large company that the weighing machine had been out of order for a considerable period, during which time all heights and weights taken had been approximate ones.

Often it is difficult for companies to find competent and reliable examiners, this does not apply so much to the Presidency towns but it is a very real difficulty in up-country stations. I was recently asked to give an opinion upon some twenty cases in which one examiner had recorded the pulse-rate at 72 in each case.

In Bengal, where most of my work has been done, the majority of Indian proposers are chiefly of the clerical and professional classes amongst whom it is exceptional to find any following the more dangerous trades. The indigenous population do not take kindly to hard work, they prefer to confine themselves more to clerical and political work, with the result that very few of the mechanical trades are in their hands, they are being done either by Mahomedans, Chinese, or up-country Sikhs.

The result of this is that all the sedentary occupations are hopelessly over-stocked and underpaid and the educated classes and graduates of the universities, etc., have considerable difficulty in earning a living wage, while the illiterate classes can generally make a comfortable income.

This has a very real bearing on life insurance in the province, where the bulk of the population work daily in offices which are often overcrowded and ill-ventilated, and at night return to insanitary and often damp dwellings where they are frequently underfed and in consequence they readily become susceptible to diseases, such as malaria, dysentery and phthisis.

The more prosperous Bengalis on the other hand lead sedentary lives and usually take excess of carbohydrate food, so tend to become obese and to suffer from diseases which are usually associated with this condition, such as diabetes, carbuncle, etc.

Before passing on to discuss the statistics which I have compiled, I should like to make a few remarks on the general risks of residence in India and more especially in Calcutta. My attention was first drawn to this subject many

years ago by noticing in the obituary columns of the press the great age at death of many Europeans who had spent the major portion of their lives in India.

During the first four months of 1915 forty-nine deaths were recorded in one newspaper with an average age at death of seventy-three years. In this list were included the names of many well-known men who after a long and often strenuous career in India had reached a good old age. One in particular might be mentioned, namely that of Lord Roberts who after forty-one years in India died at the age of eighty-two full of mental and physical energy. Of course figures of this nature can be of no comparative value, they can only shew the age at death of those who have survived and they take no account of the deaths which have occurred during active life in India, but at the same time I think it will be accepted that they indicate that residence in India, especially for Europeans, is quite compatible with old age and often a healthy old age.

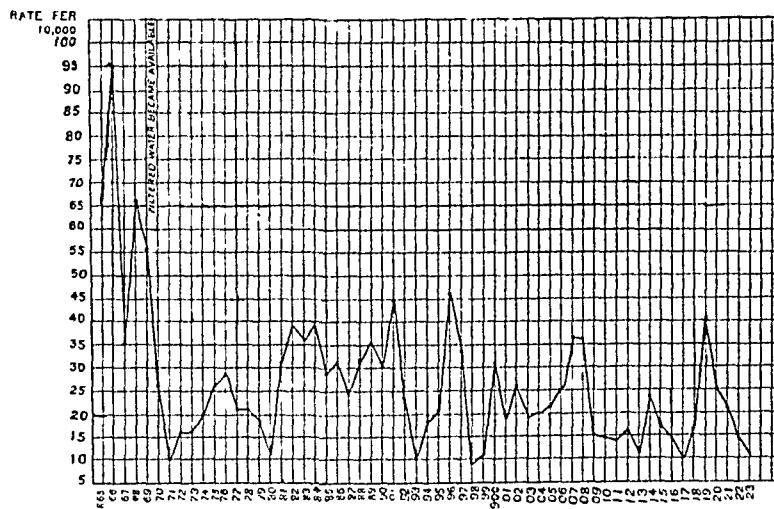
We of the present generation in India, and more particularly those of us who reside in the larger towns live under more congenial conditions and in more sanitary surroundings than our predecessors, amongst whom a considerable part of the heavy mortality was caused by what may be called accidental infections such as bacillary dysentery, enteric fever and Asiatic cholera, diseases which under modern conditions are becoming less prevalent and less fatal. The diagram (No. I) which I have compiled from the annual reports of the Health Officer to the

immediately felt. The epidemics which have occurred since this date are probably partly to be accounted for by the fact that in addition to filtered water there is also a supply of unfiltered water, which in the hands of a population largely illiterate and uneducated is always a source of danger. Epidemics may also be started by infected immigrants to the city and also by the importation of infected food, but these epidemics nowadays never become very serious. Another factor which in my opinion has a great influence in lessening the incidence of disease is the modern use of electric fans which became general about 1905. In the old days of hand-pulled punkahs it was unusual to get a good night's rest, the punkahwallah usually went to sleep shortly after his employer, with the result that mosquitoes and disease-bearing insects were given ample opportunities for causing disease and in addition abdominal chills with diarrhoea and dysentery, two frequent causes of death in India, were very much more prevalent than they are to-day. (*See Diagram No. III.*)

The following are the principal ways in which electric fans help to diminish disease:—

1. Their constant motion, especially at night, prevent mosquitoes, flies and other disease-bearing insects from infecting either man or his food.
2. They help to assist sleep and now it is rather exceptional for a healthy person to have a sleepless night, whereas in the old days of hand-pulled punkahs it was an unusual experience to sleep without being awakened on one or more occasions during the night. The punkahwallah was always inclined to work spasmod-

Diagram I.



Cholera Mortality Table for a period of Fifty-eight Years from 1865—1923.

Calcutta Corporation is interesting, as it shows the effect which the introduction of a filtered water-supply has had upon the cholera mortality in the city.

This filtered water first became available in 1869 when the cholera mortality was about 65 per 10,000 and its influence was almost

ically and his methods were a constant cause of chill on the abdomen, which frequently resulted in diarrhoea or dysentery.

3. Another beneficial effect that electric fans have is upon the temper, and I think there is little doubt that they have effected a lessening of that irritability which was formerly such a

well-known characteristic of European residents in India and was erroneously supposed to be due to hot curries. Constant want of sleep and annoyance at the vagaries of the punkahwallah, when continued over several months in each year, must have had a harmful influence upon the temper. It is a well recognised fact that the state of mind has an important effect upon blood-pressure and that fits of temper undoubtedly cause the blood-pressure to rise. The increased blood-pressure and nervous irritability when continued over long periods make themselves felt upon the arteries and in time cause thickening and possibly degeneration. Fortunately this is now a thing of the past and it is found that tropical residence with an actively perspiring skin tends to cause a low blood-pressure. During the hot weather and more especially during the rainy season it is not unusual to examine several men during one afternoon's work and to find that they all give a systolic sphygmometer reading well under 100 mm. Indians usually have low blood-pressures, but when one sees a large number of Europeans at certain seasons of the year with unusually low blood-pressure it seems reasonable to associate the condition with a climatic influence. Unfortunately, I have not at present sufficient data to support this clinical observation.

RESULT OF THE EXAMINATION OF 3,717 PROPOSERS.

These examinations have been conducted during the last ten years by my two partners, Drs. Adrian Caddy, Gordon Brandon, and myself. We have either made the complete examination ourselves or have revised the reports received from other examiners.

These cases consist of 1,473 Europeans and 2,244 Indians, most of the Indians being Bengalis.

In addition to these examinations, I have been able, through the kindness of the local representative of three large insurance companies which operate in Calcutta, to collect information with regard to 1,450 death claims, of which 1,117 occurred amongst Indians and 333 amongst Europeans. I shall refer more in detail to these death claims later.

We place the results of our examination and revisions into Classes A, B, C, postponed, or declined.

Class A consists of proposers of exceptionally good physique who shew no defects.

Class B are cases insurable at ordinary rates but they are not such good risks as those in *Class A*, owing either to poorer physique, indifferent past medical record, or some family defect.

Class C contain all proposers who shew more or less serious defects and who have been recommended either for a loading or for endowment policies of varying periods.

Class A contains 395 Europeans, 26.81 per cent. and 266 Indians, 11.87 per cent.

Class B contains 653 Europeans, 44.33 per cent. and 918 Indians, 40.9 per cent.

Class C contains 262 Europeans, 17.78 per cent. and 659 Indians, 29.37 per cent.

Postponed 113 Europeans, 7.67 per cent. and 218 Indians, 9.71 per cent.

Declined 50 Europeans, 3.39 per cent. and 183 Indians, 8.15 per cent.

From this it will be seen that comparatively few Indians come into *Class A* and that many more Indians than Europeans were either declined outright or were put into *Class C*.

The principal defects found were:—

Disease.	Indians. per cent.	Europeans. per cent.
Inferior physique ..	12	6.6
Obesity ..	8.9	3.3
Hydrocele ..	10.1	4.2
Heart disease ..	4.8	3.2
Lung disease ..	1.1	1.3
Albuminuria ..	2.2	1.09
Glycosuria ..	1.1	1.1
Bad family history ..	3.6	2.1
Enlarged spleen ..	0.9	0.3
Ear disease ..	0.9	1.09
Alcohol ..	0.0	1.2
Syphilis ..	0.9	1.7
Liver disease ..	0.08	0.8
Hernia ..	0.98	0.47

The points of interest which arise from this table are firstly the very great prevalence of hydrocele amongst Indians, secondly, many more Indians shew either inferior physique or obesity.

Albuminuria was also more prevalent amongst Indians, but I am rather surprised to find glycosuria present in the same proportion in both cases. This is probably due largely to the fact that most of the Indian candidates are comparatively young men and have not attained the age at which long-continued carbohydrate feeding has been able to produce glycosuria. My death claims, which shew that 4.9 per cent. Indians and 2.4 per cent. Europeans died of diabetes and allied diseases, rather support the inference. Alcohol and syphilis are as one would expect more prevalent amongst Europeans than Indians. The clerical classes are usually total abstainers and it is only the idle rich men and those who have been educated in Europe who take alcohol, which they frequently do to excess, also the lower classes drink large quantities of country spirit but they rarely come for insurance. Syphilis is comparatively rare amongst the better classes; they usually marry early and generally lead fairly moral sexual lives, among the lower classes on the other hand syphilis and other venereal diseases are exceptionally prevalent, so much so that doctors and nurses who work in Indian hospitals very frequently contract extra-genital infections.

HEIGHTS AND WEIGHTS.

I have here tabulated Indians and Europeans according to their heights and weights and for comparison in a separate column have shewn the

model weights given in Robertson's table. This table has been selected for comparison because it is the one we generally use in India and also because it deals more leniently with shorter men, who form the majority of Indian candidates.

Height.	EUROPEANS.		INDIANS.		Robertson's table model weight.
	Average weight.	Number of cases examined.	Average weight.	Number of cases examined.	
ft. in.	st. lbs.		st. lb.		st. lbs.
6 2	12 11	29	..	..	14 7
6 1	12 5	54	..	..	13 13
6 0	11 12	86	12 13	22	13 5
5 11	11 9	111	11 13	24	12 11
5 10	11 3	145	11 1	111	12 4
5 9	11 2	131	11 1	138	11 10
5 8	10 7	154	10 9	180	11 3
5 7	10 8	106	10 1	217	10 10
5 6	10 2	101	9 6	253	10 4
5 5	10 0	68	9 4	211	9 11
5 4	8 13	29	8 9	173	9 5
5 3	8 12	21	8 9	104	8 13
5 2	..	..	8 3	56	8 7

From these tables it will be seen that no Indians over 6 ft. came for examination, the majority of Indians were between 5 ft. 10 in. and 5 ft. 3 in., while most of the Europeans were between 5 ft. 11 in. and 5 ft. 6 in., so the Indians are on the whole rather shorter men.

At all heights Indians are considerably lighter than the normal, the figure 12 st. 13 lbs. at 6 ft. would probably have been lower if more men had been available, as it includes several unusually heavy men and even this figure is considerably lower than the normal.

The light weight for Indians is what I expected to find and it is important from an insurance point of view. Indians are always examined on the basis of the European standards as obtained from either Robertson's or Hutchinson's tables and so light weights are apt to be rather severely dealt with and conversely the normal weight of Indians being considerably lower than the standard heavy weight Indians are too leniently treated when we follow these tables. One frequently examines healthy young Indians who are men of reasonably good physique and is rather surprised to find that they scale many pounds below the minimum for their height. With regard to Europeans it will be seen that at nearly all heights they too are below Robertson's average and this light weight increases markedly when we come to examine the taller men. From the Indian examiner's experience this is not very surprising as it is a well-known clinical fact that Europeans when first coming to India tend to lose weight rather than to gain it and this applies more especially to the taller men, who do not seem to acclimatize so readily as smaller men, but even so Europeans in India are on the whole rather heavier than Indians.

AVERAGE HEIGHT AND WEIGHT OF INDIANS AND EUROPEANS AT DIFFERENT AGES.

In these latter the ages are divided into separate groups up to the age of 45 years, from 46 upwards they are all grouped together owing to the number of cases at these ages being comparatively few.

<i>Indians.</i>			
Age.	Height. in.	Weight. lbs.	Number of cases examined.
20 to 25	.. 65.74	126.33	290
26 to 30	.. 65.43	134.46	448
31 to 35	.. 66.76	150.54	336
36 to 40	.. 69.71	152.29	206
41 to 45	.. 66.50	150.50	83
46 upwards	.. 67.03	153.75	33

<i>Europeans.</i>			
Age.	Height. in.	Weight. lbs.	Number of cases examined.
20 to 25	.. 68.75	141.90	152
26 to 30	.. 70.74	145.24	264
31 to 35	.. 70.86	153.80	273
36 to 40	.. 68.22	156.97	210
41 to 45	.. 68.04	168.06	98
46 upwards	.. 67.86	146.94	53

The height of Indians in these different age groups is in all cases, except from 36 to 40, considerably lower than the Europeans, in most cases the difference amounts to several inches, which finding rather agrees with Caddy's figures given in his paper read before the Assurance Medical Society in 1912.

Also the average weight of Indians in each of these age groups is considerably lower than the weight of Europeans until the maximum age 46 years and upwards is reached when it becomes markedly greater, although in height the Indians are rather shorter men.

The light weight of Indians is particularly marked in the younger age groups and one's clinical experience rather leads one to expect this. Young Indians are generally thin and comparatively tall but in later life if they become at all prosperous, they usually incline to obesity, whereas Europeans as a rule tend to lose weight after long residence in India.

When we are considering the influence of height and weight upon life insurance, it is interesting to study Rabagliati's paper, which was read before the Assurance Medical Society in 1915. In this paper he quotes figures published by the Actuarial Society of America which deal with some 812,221 policies and which shew that underweight in early life has graver consequences than it has in later life, when it is rather an advantage than otherwise.

Those insuring at ages 20—24, who were 25 to 45 lbs. under weight showed an actual mortality

of 134 to 100 of the expected mortality and among those insuring at ages 25 to 29 years the actual mortality was 116 to 100 expected.

In latter life, on the other hand, the results are quite different, amongst those entering at ages 50 to 56 and showing the same amount of under weight the actual mortality was only 91 per cent. of the expected, and of those at ages 57 to 62 it was only 81 per cent.

Overweight has quite a different influence at all ages. A marked overweight has a bad effect at all ages, but it is less marked at the earlier ages than at the later ones.

With regard to height the same authority states that at younger ages tall men have proved to be less desirable risks than short men, whereas at older ages short and medium sized men have been the slightly worse risks.

I too have found that young Europeans who are exceptionally tall are not good risks, they frequently do not acclimatize well and often have to be sent home physically unfit to live in the tropics.

I propose now to discuss in detail some of the more important diseases which have to be considered in connection with life insurance work.

Disease.	Indians. per cent.	Europeans. per cent.
Pneumonia	12.2	9.6
Heart failure	7.9	15.9
Apoplexy	5.2	4.1
Phthisis	6.9	3
Diabetes (including carbuncle)	4.9	2.4
Liver diseases (including abscess)	4.2	3.6
Undifferentiated fevers	3.04	1.2
Kala-azar	0.9	0
Malarial fever	2.8	0.6
Enteric fever	4.2	3.9
Dysentery and diarrhoea	5.1	2.7
Cancer	1.07	3.3

With the exception of heart failure and cancer, the percentage of claims made by Indians for all these diseases is markedly greater than those made by Europeans.

RESPIRATORY DISEASES.

In Calcutta during 1923 these diseases accounted for the death of no less than 6.7 per thousand of the total population, the most fatal diseases being phthisis, pneumonia and bronchitis.

PHTHISIS.

Rogers gives figures from the post-mortem records of the Medical College Hospital,

Diagram II.

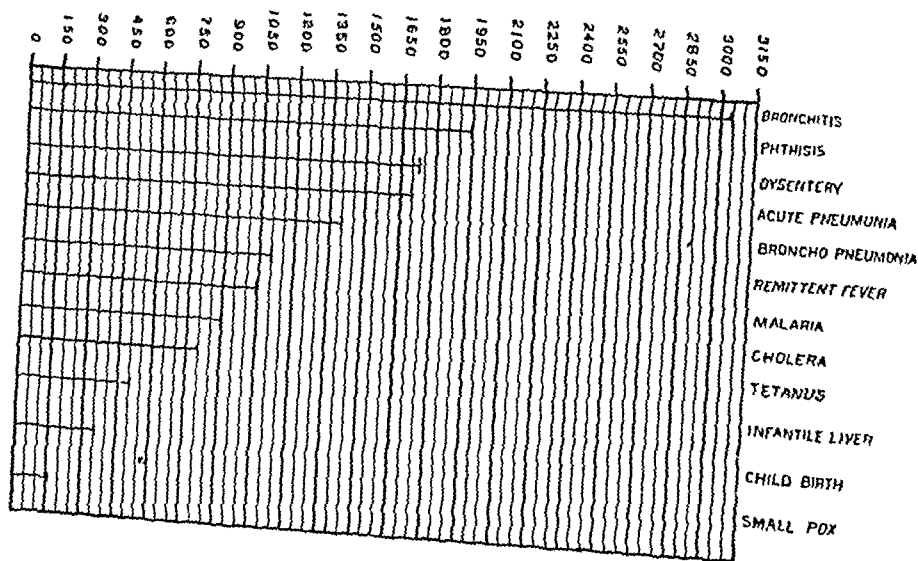


Diagram II has been taken from the latest available annual report (1923) of the Health Officer to the Calcutta Corporation and shews the total number of deaths which occurred in the city from twelve of the principal diseases during that year. It will be seen from this table that respiratory diseases and dysentery cause the greatest mortality.

My death claims which will be referred to from time to time have been compiled so as to shew the percentage mortality from the more important diseases as they affect Indians and Europeans. They include 1,117 Indians and 333 Europeans death claims:—

Calcutta, which shew that 16.1 per cent. of the cases examined by him were due to phthisis. The Health Officer states that the tuberculosis death-rate is 2.3 per 1,000 of the population and further he shews that nearly all the tuberculosis deaths are due to phthisis. In 1923 this disease accounted for 2,089 cases or 94.2 per cent. of the total tuberculosis deaths, which leaves only about 6 per cent. for surgical tuberculosis and other types of bovine origin, whereas in London 20 per cent. of the tuberculosis deaths are due to these types.

This absence of bovine tuberculosis in Calcutta where cattle are usually free from tuberculosis,

is not altogether an unmixed blessing, it probably accounts for the fact that phthisis amongst Indians runs a very acute course. The Health Officer states that it is probable that the great majority of Indian phthisical patients die not later than one year after the first symptoms appear.

In this connection it is interesting to note that Powell in Bombay conducted 8,000 post-mortems on Indians and only found signs of old phthisis in 2.3 per cent. of his cases, whereas in the United Kingdom no less than 85 per cent. shewed signs of old infection. The difference is probably due to the absence in India of minor immunity-establishing infections from tuberculous milk and this absence of immunity may possibly account for the acute type of disease found in Indians.

Amongst Indian women phthisis is especially prevalent, the majority of women adhere to the *purdah* system which usually necessitates their living in ill-ventilated and insanitary buildings with little or no access to the outside world.

In Calcutta the death-rate amongst women is always higher than amongst men, whereas in London it is the men who always suffer more severely. This point is emphasized in the following figures which have been collected by Dr. Mazumdar of the health department of the Calcutta Corporation for the last ten years:—

		Tuberculosis Death Rate amongst males per 1,000 living.	Amongst females per 1,000 living.
1914	..	1.8	3.6
1915	..	1.6	3.2
1916	..	1.3	2.6
1917	..	1.3	2.5
1918	..	1.6	2.9
1919	..	1.6	3.2
1920	..	1.7	3.6
1921	..	1.8	3.7
1922	..	1.7	4.0
1923	..	1.6	3.7

The increase during the last five years is probably the aftermath of the severe influenza epidemic in 1918.

Taken as a whole the figures shew conclusively that the death-rate from tuberculosis has remained fairly constant during the last ten years, whereas in London it has shewn a fairly steady decline and during the last 80 years it has fallen from 3.5 per thousand to 1 per thousand.

My own death claim figures shew that amongst Indians phthisis accounted for 6.9 per cent. of the total deaths while amongst Europeans it was only 3 per cent.

The causes of this heavy incidence amongst Indians are chiefly:—

1. Insanitary housing conditions with lack of fresh air and sunlight, which is aggravated by overcrowding and the retention of the *purdah* system in a city densely populated.
2. Promiscuous spitting in an atmosphere often dry and dusty.

3. Underfeeding.

4. I have already mentioned the infrequency of minor infection with bovine tuberculosis, which must also be considered a cause.

5. General susceptibility of Indians to pulmonary disease.

PNEUMONIA.

Lobar and broncho-pneumonia in Calcutta accounted for rather more than 3,000 deaths in 1923.

Lobar pneumonia in particular is a very fatal disease amongst Indians, the mortality being almost as great as that from phthisis.

Rogers' post-mortem records shew that in 16.03 per cent. of his cases death was due to lobar pneumonia, while the Health Officer gives it as the cause of death in 1.9 per thousand of the population and further he states that it is essentially a disease of the prime of life, no less than 37 per cent. of the deaths occurring between the ages of 21 and 40 years.

The race incidence was highest amongst Hindus, distinctly lower amongst Mahomedans, and much below the average in Europeans. My death claim figures shew that 12.2 per cent. of deaths occurred amongst Indians, whereas only 9.6 per cent. were amongst Europeans.

A considerable number of cases of pneumonia in Indians terminate in gangrene of the lung, which fact suggests a low resisting power amongst them to inflammatory conditions of these organs.

There is a well marked seasonal incidence, 42 per cent. of deaths occur in the four coldest months, November to February; 31 per cent. in the very hot weather months, March to June; and 27 per cent. in the rainy months, July to October.

DYSENTERY AND DIARRHŒA.

Under this heading are included dysentery, diarrhœa, enteritis and puerperal diarrhœa known to Indians as *sutika*.

The attached Diagram III taken from the Health Officer's returns shews the number of deaths from these diseases per 10,000 of the population during the last twenty years, from which it will be seen that bowel complaints are much less fatal now than they were in the earlier years, but that even now they account for a large number of deaths every year. In 1923 no less than 3 per 1,000 of the population of Calcutta died from them.

	Deaths.
Dysentery accounted for	1,677
Diarrhœa " "	958
Puerperal diarrhœa " "	99

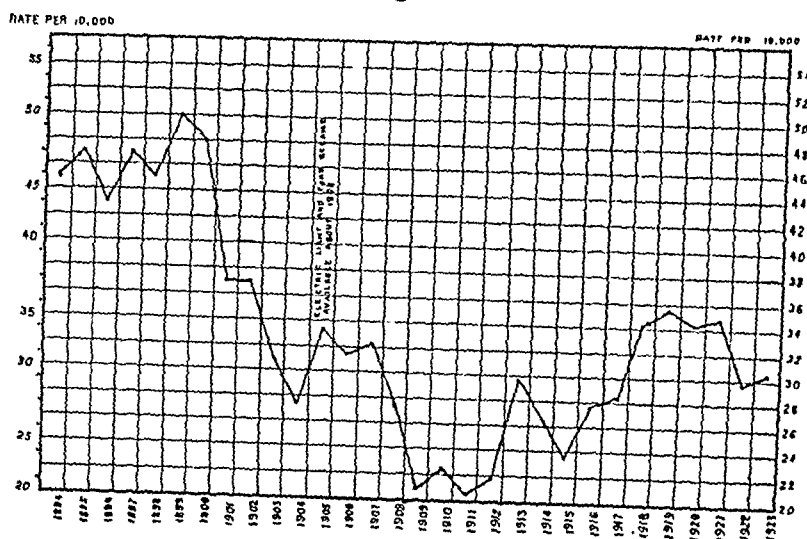
The mortality figures shew a well marked double curve of seasonal prevalence. The first reaches its height in March and the second, a much larger one, in August, during which month they accounted for no less than 4.4 per thousand of the total population, the lowest mortality is in the hot weather months of May and June,

which are well known to be the most healthy months to residents in Calcutta.

The suburbs always suffer more severely than the centre of Calcutta owing to the large number

Also chronic malarial infection and kala-azar frequently affect the liver in both races and they are more prevalent and severe amongst Indians than Europeans.

Diagram III.



[Diarrhoea and Dysentery Mortality Table, Calcutta, 1894—1923.

of service privies in them, which pollute soil and water and afford facilities for the contamination of food through the agency of flies. This condition obtains throughout all Bengal.

Mahomedans seem to suffer most severely and Europeans least, the low figure for non-Asiatics 2.2 per thousand is probably due to the fact that they usually live under better hygienic conditions.

My death claims also shew that Indians suffer more severely than Europeans, the figures are 5.1 per cent. and 2.7 per cent., respectively.

The highest mortality occurs at the extremes of life, chronic dysentery and diarrhoea being especially prevalent and fatal in old age.

DISEASES OF THE LIVER, INCLUDING ABSCESS.

My death claims shew that 4.2 per cent. Indians and 3.6 per cent. Europeans died of liver disease.

It is rather surprising to find so many claims arising from Indian cases as the bulk of the better class Indians, who are the insuring class, are total abstainers. Lower class Indians undoubtedly drink large quantities of country spirit, which is very impure and intoxicating, so it is not surprising to find liver diseases frequently amongst them.

On the other hand high class Indians, especially Hindus, in addition to being total abstainers are also vegetarians, so amongst them some non-dietetic cause must be looked for and it seems possible that chronic rectal ulceration, usually dysenteric, may be a factor in producing both acute hepatitis which frequently goes on to abscess formation and also a chronic hepatitis which may possibly cause the liver to become cirrhotic.

FEVERS.

Diagram IV shews the fever mortality in Calcutta during the last thirty years.

It includes deaths from the following fevers:—

1. Malaria and kala-azar.
2. Remittent and undifferentiated fevers.
3. Probably a certain number of atypical cases of well-known fevers as enteric, pneumonia and even tuberculosis.
4. Other well-defined fevers which would be correctly diagnosed by well-qualified doctors.

It will be seen that there has been a marked decline in the fever mortality during the past thirty years, but it is probable that the reduction has not been so great as would at first sight appear. Owing to improved methods of diagnosis more diseases than formerly are now being classified under their proper headings. There is, however, no doubt that fevers, especially malignant malaria and kala-azar are very prevalent in Calcutta, which is an ideal city for their spread and especially so for malaria. The atmosphere is hot and damp for many months in the year, foul tanks with decomposing vegetable matter are found in abundance, and in addition the subsoil water is usually at a high level. These conditions obtain in practically all parts of Bengal, where they are even more marked than in Calcutta itself.*

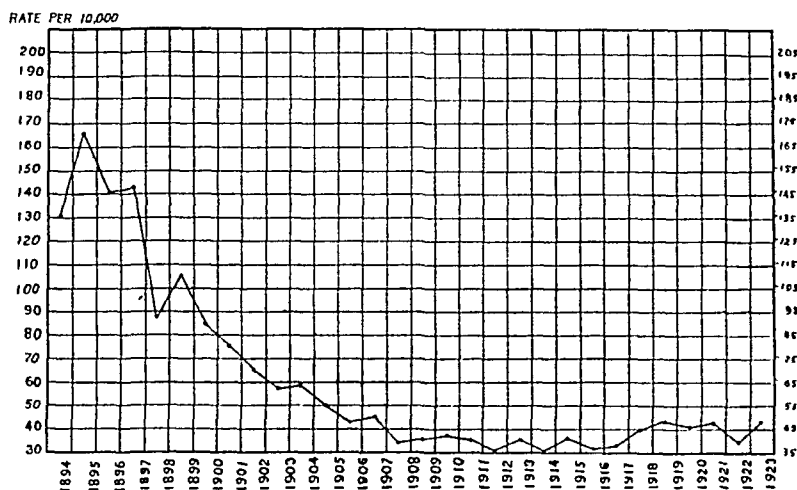
* Calcutta city itself is not very malarious, but its environs are, and many of the Indian clerical class concerned live in the environs. Dr. Napier has shewn that kala-azar in Calcutta city spreads in and around Ward 14, but not elsewhere. On the other hand conditions in the environs of Calcutta and in Bengal generally are ideal for the spread of both diseases.—Editor, *Indian Medical Gazette*.

Malaria has a well-marked seasonal prevalence, the incidence being greatest in the months of October and November and declining to a minimum in the hot and comparatively dry months of April and May.

which 2,330 were for the radical cure of hydrocele, or 83 per cent.

The majority of these hydroceles were much larger than the ones usually operated upon in European hospitals for the simple reason that

Diagram IV.



Fever Mortality 1894-1923, Calcutta.

All fevers affect Indians to a greater extent than Europeans; this is probably due to their living in the more unhealthy parts of the city and of the presidency generally.

My death claims shew how markedly different this racial mortality is:—

Deaths.	Indians. per cent.	Europeans. per cent.
Fevers (undifferentiated)	.. 3.04	1.2
Kala-azar	.. 0.9	0
Malaria	.. 2.8	0.6
Enteric fever	.. 4.2	3.9

HYDROCELE.

In books on life insurance very little notice seems to be taken of this disease, which is extremely common amongst Indians, much more so than amongst Europeans.

The result of my examinations shew that 10 per cent. of all Indians examined have hydrocele, whilst amongst Europeans it was only found in 4.2 per cent. of the cases.

My figures would have shewn an even smaller proportion amongst Europeans, had not Jews been included amongst them. The Jews examined are really more closely allied to Asiatics than Europeans, as they chiefly are Armenian Jews from Baghdad. Without them the European figures would have shewn only 3.1 per cent.

The operation figures taken from a small Indian hospital to which I am surgeon-in-charge bring out very clearly the extreme prevalence of this disease amongst Indians. During the last eleven years from 1914 to 1924 we have performed at this hospital—excluding gynaecological and eye cases—2,798 major operations, of

the Indian will not submit to operation until his hydrocele is sufficiently large to interfere with locomotion or until his penis has almost disappeared in the swelling.

In addition to these hydrocele operations we have removed 112 scrotal tumours of filarial origin most of which contained large double hydroceles.

It is true that the risk of operation is not very great, amongst these 2,330 operations we have had only two deaths, but it must be remembered that in a hot country like India where the skin of the scrotum is generally heavily infected with organisms of suppuration, often superimposed upon a chronic scabetic infection, many hydroceles suppurate from trivial causes and it is not uncommon to find the suppuration causing death before operation is performed.*

I am of the opinion that most companies treat hydrocele risks rather leniently. They usually accept cases of single hydrocele, unless very large, at ordinary rates, while for double hydrocele they require only a small loading of $\frac{1}{4}$ per cent.

GLYCOSURIA.

Glycosuria in India as in England is a common cause for declining or postponing proposals and in many cases it is a little difficult to know quite how to deal with them, especially so when the proposer is a young and obviously healthy man. It is astonishing how frequently young healthy Europeans who reside in the tropics

* Acute funiculitis—often of filarial plus streptococcal origin—is a very fatal disease, and is probably another factor involved.—Editor, *Indian Medical Gazette*.

exhibit glycosuria after some temporary indiscretion in diet, so much is this the case that when I find sugar in a European during an afternoon examination I always enquire into his diet for lunch and I generally find that, not wishing to create a false impression by smelling of alcohol, he has taken ginger beer instead of his usual whisky and soda. Of course the amount of sugar contained in one or perhaps two bottles of ginger beer should not normally be sufficient to come near the renal excretion threshold but possibly a tropical climate may have some influence in lowering this threshold and also most Europeans who live in India hold responsible positions which usually entail considerable worry.

These cases to which I am now alluding are on subsequent examinations practically always free from sugar, but still, having once found sugar, one has to regard them with suspicion.

The present course adopted by many insurance companies who insist on three negative examinations is to my mind unscientific. It is unfair to the proposer as it makes no attempt to differentiate true diabetes from renal glycosuria with its low excretion threshold and also it is unfair to the company in so much that a knowledgeable man will consult his doctor and may often free himself from sugar by treatment.

From an insurance point of view the important point to discover is the condition of the blood sugar. It is very simple and inexpensive to get this done, and in my experience proposers will readily consent to have the examination made, often at their own expense, if the necessity for it is explained to them.

It is now well recognised that proposers with a high blood sugar may shew little or no glycosuria, while others with normal or low blood sugar may shew a frank glycosuria.

In this connection it is interesting to note that Indians who are vegetarians tend to have a higher blood sugar than non-vegetarians (Bhatia, *Indian Medical Gazette*, December, 1925). This observer also noticed that estimations made in the morning gave a lower figure than those made in the afternoon about four and a half hours after the morning meal. Sugar excretion is apt to be modified by defective kidneys, so faint traces of glycosuria in middle or advanced age may be an indication of a high blood sugar, and in consequence should be treated with suspicion.

In conclusion, I would like to draw attention to the result of my own examinations which shew that glycosuria was found amongst Indians and Europeans in an equal percentage of cases (1.1 per cent.). This is rather surprising as it has always been thought that Indians, and more especially Bengalis, were very susceptible to glycosuria, but perhaps it may be accounted for by the fact that it tends to appear in Indians late in life and that the majority of the cases examined were those at a comparatively young age. My death claims shew that diabetes and

allied diseases such as carbuncle accounted for 4.9 per cent. of Indian deaths and only 2.4 per cent. of European deaths.

KIDNEY DISEASES.

According to Rogers these diseases are less frequent in Bengal than in London, which fact he attributes to the greater incidence of acute parenchymatous nephritis and granular kidney in London.

One would expect Indians and especially Hindus, owing to their vegetarian diet and the general absence of scarlet fever in the plains, to be comparatively free from diseases of the kidney. Also the activity of the skin during the hot and rainy seasons must decrease the amount of toxins which pass through the kidneys, and as I have already shewn it has a marked lowering effect upon the blood-pressure especially during the rains.

In England kidney disease with high blood-pressure and arterial degeneration is a common cause of death, but the practitioner in India does not seem to meet with this class of case so frequently as he does when practising at Home.

Perhaps to a certain extent this may be accounted for by the fact that Indians die from other diseases at an earlier age than Europeans and do not so frequently attain the age at which granular kidney develops. On the other hand Indians frequently have albuminuria, my figures shew that 2.2 per cent. of Indians were either loaded or declined on account of albumen whereas only 1.09 per cent. of Europeans were similarly treated, but then the presence of albumen does not necessarily indicate disease of the kidney, and unless kidney efficiency tests are done or some other clinical manifestations are present it is not possible to say how much of this albuminuria is due to actual disease of the kidney.

The present custom of many insurance companies who require three urine tests to be free from albumen is on the whole a fairly good one, because within the limits of an insurance examination it is not possible to carry out the elaborate tests which are required to make an accurate investigation into the cause of the albuminuria.

DISEASES OF THE HEART.

The two chief causes of valvular disease of the heart and of endocarditis and pericarditis which are so frequently found in Europe, namely acute rheumatism and scarlet fever, are exceedingly rare in the plains of India.

Rogers, writing in the *Glasgow Medical Journal*, in January 1925, compares the post-mortem records at St. Mary's Hospital, London, with those of the Medical College, Calcutta, and finds that circulatory diseases are twice as common in London as in Calcutta. He attributes this to the almost entire absence of rheumatic endo- and pericarditis in Bengalis; on the other hand malignant endocarditis was frequently found in Bengal and in many cases the

pneumococcus was found in the diseased valves. This is not at all surprising when we consider how frequent and how fatal pneumonia is amongst Indians.

Basu writing in the *Indian Medical Gazette* concludes that chronic endocarditis is less frequently found in Indians than in Europeans, but on the other hand myocardial degeneration is very prevalent and is largely responsible for the early death of the people. The cardinal factor for this mortality is climatic which causes vasodilation and by throwing greater work on the heart draws largely upon the cardiac reserve, which owing to poverty of food and chronic infections such as malaria, dysentery, kala-azar and beriberi, is at the best of times never very great. Beriberi and epidemic dropsy in particular cause heart symptoms with tachycardia which often persist in spite of all treatment for many years. In my list of death claims it will be seen that heart failure is found to be twice as frequent in Europeans as in Indians, 15.9 per cent. against 7.9 per cent. but apoplexy on the other hand is rather more frequent in Indians 5.2 per cent. against 4.1 in Europeans.

Possibly this may be accounted for by the fact that Indian syphilitics do not undergo very thorough treatment for this disease.

PYORRHOEA.

Pyorrhœa is extremely prevalent in the tropics and especially so amongst Indians, it usually begins as an inflammation of the gum margins, which gradually spreads to the bony sockets of the teeth and causes them to become loose and eventually to fall out, unless the tartar which usually appears, and is seldom removed, is sufficiently hard to form a splint.

Bodley Scott in the course of investigations amongst prisoners in the Sylhet jails found that at the age of 25 years only 50 per cent. have healthy gums and that this number gradually decreased until at the age of 55 only 6 per cent. were free from the disease. The incidence seems to be most marked in the hot weather months which rather suggests that general health may have some bearing upon it.

Another factor which may possibly be the starting point is a local infection of the gum margin. It is the custom amongst many Indians to pick up any piece of stick, preferably a piece of *neem* stick, and to make it serve as a combined toothbrush and tongue scraper, which to my mind is usually the starting point of the infection.

In spite of the extreme prevalence of pyorrhœa amongst Indians many diseases supposed to be secondary to a focal infection such as appendicitis, gastric and duodenal ulcer and rheumatoid arthritis are extremely rare amongst them, on the other hand muscular rheumatism, lumbago and dyspepsia are common.

Many insurance companies do not care to accept cases with marked pyorrhœa, but as the slight cases practically always are progressive,

especially so amongst a race who seldom have dental treatment, if one did not treat the condition leniently very few Indian proposals would be accepted.

CONCLUSIONS.

1. The risk of Indian residence is steadily decreasing for both Europeans and Indians.

2. Taken as a whole Indians are considerably worse risks than Europeans and insurance companies probably act wisely when they encourage endowments rather than whole life policies for Indians.

3. Indians are usually men of shorter stature than Europeans and their corresponding weights generally are lower.

This is particularly noticeable in the younger men, but older men are inclined to become heavier than Europeans. Indians who are overweight should be regarded unfavourably, they are generally prosperous, lead sedentary lives, and eat carbohydrates to excess.

4. Respiratory diseases and more particularly pneumonia and phthisis are very fatal diseases for Indians. The phthisis mortality shews no tendency to decline and the disease is usually of a very acute type. It is more fatal for women than men, probably owing to the *purdah*.

5. Dysentery and bowel complaints are very fatal for Indians but the mortality from these diseases has declined considerably during the last thirty years.

6. The mortality from fevers declined rapidly in Calcutta up to 1908, since when it has remained fairly constant.

7. Hydrocele is especially prevalent amongst Indians and is an occasional cause of death.

8. Glycosuria is not very prevalent amongst Indians until they reach middle age, after which its incidence increases and it becomes more fatal for Indians than for Europeans. Indians tend to have a higher blood sugar than Europeans.

9. Owing to the infrequency of acute rheumatism and scarlet fever, valvular disease of the heart is not so common amongst Indians as amongst Europeans, but malignant endocarditis and myocardial degenerations are common.

10. Pyorrhœa is very common amongst Indians, so much so that after middle age few seem to be free from it.

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PRINCIPLES IN THE TESTING OF A CURE.*

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THE lay public consider that all that is required in testing the value of a supposed "cure" for a disease is to give the drug, and if there is any improvement (whether it be temporary or permanent) then the drug is considered to have been sufficiently tested on this single case, and to be a cure for the disease. That such an idea is universal amongst the lay public is seen from the advertisements in our daily papers, and we can readily understand the layman's point of view. But why a similar belief should be so prevalent amongst medical men, and why they should adhere to it for so many years on end, it is difficult to understand. This remark applies with still greater force to medical research workers, who ought to be acquainted with modern biometrical methods. Most workers in India have not as yet appreciated how much we owe to Lieutenant-Colonel W. F. Harvey, C.I.E., I.M.S., for his introduction of mathematical and biometrical methods into the study of rabies and allied diseases in India.

At present we see in our medical journals papers based on a series of two or three cases successfully treated by one drug; to be followed in a short time by another author who refutes the value of the first drug, but extols a second one on equally scanty evidence. At times one's head whirls as one reads through present-day medical literature and comes across a disease with at least thirty different cures for it, but with no indication as to when any particular one of them should be employed in the disease. Sir Kingston Fowler, K.C.V.O., M.D., in his clinics taught that when a disease has a host of cures, there is no cure for it. I am sorry to say that I now disagree with his views, but when there is a host of cures for one and the same disease, the position really is that we do not know definitely how these different drugs act on the system. Take, for instance, the value of atropine and cocaine in vagotonia, and of adrenalin in sympathicotonia; they are excellent as temporary remedies, but they do not cure the two types of asthma concerned. In this country we have two "systems" of medicine for which exaggerated claims are made by their supporters, the Ayurvedic or indigenous system, and homeopathy. There can be only one system of medicine, that which enables us to make a sure diagnosis, and gives a remedy which is a safe and efficient cure for the particular disease. We must also realise that our tissues have been given certain defence mechanisms in order to fight the diseases that attack our bodies; and that natural cures do not occur in an instant, but require time in order to develop, though they are usually extremely efficacious. For this reason, the last remedy to come to hand often seems to us to have been the one most effective in bringing about a cure.

When we come to a still more difficult subject, such as to assess the relative values of two different salts of the same metal, or of two almost identical alkaloids, as we shall see later, very large numbers of tests under identical and controlled conditions are requisite before any definite opinion can be given one way or the other.

The time has come when we should survey the position rationally, instead of making claims for this, that or the other drug upon wholly insufficient evidence.

The Action of Drugs.

If we ask ourselves the pertinent question, how do drugs act, we will see that even to-day very little is

known about their real effects upon the body or upon the parasitic causes of disease.

Drugs may be classified into two groups:—

(1) *Specific drugs.*—These act upon the parasites in doses which are non-lethal to the human host; and they may again be sub-divided into two groups:—

(a) Drugs which act selectively—and possibly directly—upon the parasites; such as the use of quinine in malaria, and of emetine in amoebic dysentery. Our recent work has shewn that, to be efficacious, the site of greatest concentration of such drugs within the body should coincide with the site of most rapid multiplication of the parasite concerned. Moreover the absorption and concentration within the body is increased or decreased by changes in the pH of the gut; also such drugs act best in an alkaline substrate. They probably act by interfering with the movements of the parasite, or by rendering its food supply from the tissues distasteful to it; for instance it has been shewn by Dale and Dobell that *Entamoeba histolytica* will not ingest emetinised red blood corpuscles.

(b) *Specific drugs* which act only indirectly upon the parasite, but which are specific cures for the disease; for example, the use of arsenical derivatives in syphilis, and of antimony compounds in Leishmania infections.

(2) *Empirical Drugs.*—These are not specific cures for an infection with a given parasite, but are given empirically. Many of them stimulate the defence mechanisms of the body in one way or another, and so bring about a cure. Diseases such as asthma are not true diseases but are symptom-complexes, clinical entities caused by a whole host of different causes. We see therefore that in the cures advocated for asthma there are at least 20 to 30 drugs which have been used; each having its own value in a given case, and acting either temporarily or permanently. The cure rate with these empirical drugs will always be low, because they will only act if the exact defence mechanism concerned is not paralysed, is capable of responding, and can be stimulated.

This brief account will show that we are a long way from understanding how drugs act, but we can see clearly that if our diagnosis is correct, it is with the specific drugs that there will be the greatest probability that cure will occur. With empirical drugs we place the lucky sign of Jupiter at the head of our prescriptions, and hope that chance or luck will favour our efforts.

The Mechanism of Cures.

Now cures can be brought about in two ways:—

(1) *Naturally.*—In bacterial diseases we have tissue-response to the invasion, with the production of anti-substances, and finally the establishment of a definite immunity. In protozoal infections, there may be a special association between the species of host and parasites; thus the malarial parasites attack only man, and can only—and that only as a transient infection—be transmitted to the higher apes; on the other hand there is often a close association of groups with genera; thus the (true) Leucocytozoa are parasites only of birds. With repeated attacks however, and with age, a relative immunity—or perhaps, more strictly speaking, a tolerance—may be acquired; for example the difference in incidence of febrile attacks of malaria as between children and adults in an endemic malarial area.

(2) Secondly, cures can also be brought about artificially. In bacterial diseases we may bring about artificial cure by conferring active or passive immunity. In protozoal diseases we have many specific drugs, such as quinine, emetine and antimony; in the case of spirochætal infections, the derivatives of arsenic. We can also bring about a cure by raising the internal defence mechanism by good feeding, the administration of endocrines, etc. Now all these factors, such as race, age, susceptibility, and the state of the internal defence mechanism, play their part in cure; and if we neglect them we may find that our population under treatment

* Being a paper read at a meeting of the Medical Section of the Asiatic Society of Bengal on Monday, the 12th April, 1926.

[Note.—We regret that owing to a mistake on the part of the press, Major Acton's article has been set up in small type.—EDITOR, *Indian Medical Gazette*.]

with the supposed cure, and our untreated control population, are made up of two groups which are very dissimilar.

All diseases cause injury to the tissues upon which they act. We may have:—

(1) Injury, with complete recovery, as in measles, mumps, etc.

(2) Recovery, but with permanent impairment of the functions of an organ. Thus the damage to the heart after endocarditis, or to the kidney after nephritis must always be permanent: such damage may be likened to a permanent scar upon the cutaneous tissues.

(3) Lastly, we may have recovery, but with permanent loss of function. This is most commonly seen when the central nervous system is attacked, as in hemiplegia, lathyrism and other paralyzes.

So we see that, although recovery may take place, yet there may be permanent damage left; under such conditions it may be very difficult to assess the value of a cure,—for instance in the treatment of nerve leprosy.

Kinds of Cure.

Now cures may be of two kinds. They may first of all be *permanent* and associated with more or less complete immunity, such as is seen in the specific fevers, and in such bacterial diseases as typhoid fever. On the other hand, the cures may only be a *temporary* matter, with a reduction of the number of parasites to a level insufficient to cause symptoms, but without their eradication; as in malaria and syphilis. In syphilis the involvement of the central nervous system may come on many years after the initial lesion, in the form of tabes or general paralysis of the insane. Again, in hereditary diseases such as asthma, where a lowered internal defence mechanism may be inherited, but can be raised artificially by treatment, any debilitating condition may cause this syndrome to appear. In these diseases *time* becomes a very important factor in determining whether a patient is or is not cured. It is for this reason that we cannot yet determine the relative merits of the different arsenical compounds in the treatment of syphilis; they have not yet been in use over a sufficient period of years to demonstrate their final value. If it can be shewn subsequently that their use has lowered the general incidence of tabes and of general paralysis of the insane, then we shall be in a position to gauge their relative efficiency.

Before we can pass on to discuss the different methods which we have for testing a cure, we must first know the following facts:—

(A) The *ætiological* factors that may affect the homogeneity of the population which we have under test. The first important factor under this heading is *age*. You all know how age affects the probable duration of life. It is on this that all insurance tables are based; each year up to middle life means an additional increase in the resistance of the individual, each year beyond it a diminished resistance. Again *hereditary* factors come in, such as race, family and sex; these all play their part in the incidence of and resistance to certain diseases. The third important factor is *environment*. This is important in tuberculosis and leprosy, where the person at risk often lives in contact with other diseased individuals; or in malaria or kala-azar where a cured patient may become re-infected when he returns after treatment to the same environment in which he first contracted the infection. In such diseases, tests for a cure should be conducted only in non-infective areas.

You can see how hopeless it would be to treat malarial cases with one or other cinchona alkaloid in an infective area, where one group of persons being treated with alkaloid A was being observed during the off-season, and a second group B during the infective season. The way to test the value of a cure for malaria is to take the patients out of the infective area, e.g., to the hills, and to conduct the observations in a non-endemic area.

Under the heading of environment we have also to

consider the occupation, habits and customs of the individual. Lastly, there are the *effects of concomitant and debilitating diseases*; thus leprosy or kala-azar is more difficult to treat when complicated by syphilis; and the anemia in a case of malaria may also be partly due to heavy hookworm infestation, treatment of which is just as necessary as of the malaria itself. It is not difficult to see how these factors may affect the composition, either of the population under test, or of the controls, and so cause variation.

(B) Secondly, we must also know the *untreated mortality rate* for the disease in question. This is closely bound up with the above mentioned *ætiological* factors. For example, the mortality rate in such a disease as pneumonia will always be a small one in such a selected population as the army, since the men concerned are in the prime of life, between 20 and 45 years of age, well fed, and have regular exercise. On the other hand, in a civilian hospital population which includes the young, the old and the debilitated, the mortality rate for pneumonia will always be higher than in the army. Any treatment in the army group would always give better results than in the civilian hospital group. At present in pneumonia we can only depend on indirect remedies, such as heart tonics, nursing, etc., and in estimating their success we are therefore relying on partial correlations.

In some diseases the natural mortality rate is very low. For a general dog-bite population as treated at any Pasteur Institute,—and which includes persons bitten by rabid and non-rabid animals, by infective and non-infective animals, persons at real risk, and others at no risk at all,—I would not put down the mortality from hydrophobia among the untreated at more than 2.5 per cent. among a homogeneous population. In India cases of bites from non-poisonous snakes far outnumber cases of bites from poisonous snakes, whilst, for many reasons, a poisonous snake may often fail to give a lethal dose of venom; hence I would not assess the mortality from snake-bite amongst all persons bitten at more than 7 per cent. in untreated cases. These low natural mortality rates give ample scope for any and every kind of quack treatment, as the natural cure rates are very high. The general public look upon every case of bite from a presumably rabid dog, or from any kind of snake, as necessarily fatal unless treated, and any case of recovery to be a cure; hence any remedy employed will be called a cure, no matter how worthless it may prove to be when tested under rigid experimental conditions in the laboratory. Again, there are epidemic diseases such as small-pox and cholera where the mortality rate varies enormously with the particular epidemic concerned, and even during the course of the same epidemic. Thus whether alastrim, with its very small death rate, is or is not small-pox, it is difficult to say. There is at least one disease in man, on the other hand, which is always fatal, no matter what remedies are employed, and that is hydrophobia.

Errors in Assessing the Value of Figures.

Before we can test whether a particular line of treatment is or is not successful, we must first eliminate any errors that may arise in the composition of the population concerned. The first error, and a very important one, is that produced by *bias*. We may take it for granted that every medical man is sufficiently honest not deliberately to alter his figures. There is, however, an element of bias which is often carried out unconsciously when dealing with the controls. Monsieur Pasteur himself in his anti-rabic experiments committed this error unconsciously, when he placed among his "treated" dogs those untreated animals which had already survived the test by subdural inoculation of rabies virus. One is more apt to place among the controls any case that may possibly increase the mortality rate among the untreated. The way to avoid this very important error is to take cases in turn alternately and place them in the two groups without any selection. Even in spite of such care, some selection will occur, as we shall presently see. The safest way to prevent

this unconscious bias is to be if anything more favourable to the controls than to the treated group, because if the remedy tested has any value at all, its value should become apparent in spite of any bias favourable to the controls.

A natural selection also occurs owing to the *law of chance sampling*. If a coin is spun 100 times, on an average heads should turn up 50 times, and tails 50 times. Yet in any actual series of 100 spins we may get a marked preponderance of heads or of tails. If, among the untreated, heads represent recoveries and tails deaths, we see that a disease which has a natural death rate, let us say, of 25 per cent., may thus be profoundly affected, especially if the number of observations made is small. I will now give you three illustrations of how such random sampling may affect results:—

(1) Chart II (*vide* p. 276) gives the number of deaths from snake-bite which have occurred amongst the British army, the Indian army and the jail population in India during the years 1890-1925. (The figures for the years 1911 to 1919 are missing, as they are not given in the annual returns of the Public Health Commissioner, India). The first point with regard to these figures is that the mortality rate in snake-bite in general is a small one, 7 per cent.; this means that bites from all sorts of snakes, including a preponderance of bites from non-poisonous snakes, are included; 93 out of every 100 persons bitten escape death. To the general public this means that any remedy employed becomes a cure. If to this "cure" rate we add various difficulties in obtaining the drug, upon which the vendors of quack remedies so often insist, such as that it must be collected at a certain time of day, at a certain place, or in a certain season, or by the light of the moon, etc., so as to make it very difficult to obtain the remedy when a case of snake-bite has occurred we see that the "cure" becomes even more effective. The result is that those who are bitten and into whom a fatal dose of venom has been injected, die early; they cannot obtain the "cure" sufficiently early to save life; these deaths therefore pass into the group of untreated controls, and swell the mortality in this group; on the other hand the persons who will survive in any case, survive to obtain the "cure," and the absence of mortality among them lowers the mortality among the treated group. Even genuine investigators often fall into this error.

TABLE I.

Showing the effect of the lateness of arrival at a Pasteur Institute on the efficacy of the treatment.

Days late.	KASALI 1924. (c)	(b) MCKENDRICK.			(a) HARVEY AND ACTON 1912.
	All cases.	Face.	Arm.	Leg.	All cases.
0—3	1.33				
4—7	0.57	6.45	1.07	0.63	2.8
8—14	0.67	8.01	1.26	0.66	1.8
15—21	0.93	9.46	1.60	0.90	2.1
22—28					0.3
29—35	0.90				0.3
36—42	2.94				
43—49	2.56				
50—161	Nil|52 cases.				

(2) Table I gives figures shewing the effect of lateness of arrival on the mortality rate from hydrophobia among patients treated at the Pasteur Institute of India,

Kasauli; (a) during the years when Colonel Harvey and I were in charge; (b) when Major McKendrick was in charge; and (c) when Major King was in charge.

When a Pasteur institute first opens its mortality is generally a high one. This is because at first it only attracts bad cases, i.e., those who have been really bitten by really rabid animals. By degrees, as knowledge of the institute spreads and of the facilities offered, more and more persons who are less and less at risk come for treatment; persons bitten by non-rabid or non-infective animals, persons who are merely licked and not at risk at all, persons even who do not know whether they have been licked or not. Hence with an increasing element of those not-at-risk, the natural tendency is for the mortality rate to decline steadily, no matter what is the treatment given.

Further, lateness of arrival affects these figures. At first the Kasauli institute was the only one in India, and drained the whole population of India. Then the Coonoor Institute was opened. In the time of Colonel Harvey and myself, the Kasauli Institute drained the whole of Northern India and Burma. Further, when one death from hydrophobia has occurred among a group of persons bitten, there is a natural tendency to send immediately all persons bitten by the same animal for treatment, no matter what interval has elapsed since they were bitten. In many such persons there is a great risk of developing hydrophobia; hence the inclusion of these cases tends to increase the mortality rate. In brief, lateness of arrival tends to increase the mortality rate. In Major McKendrick's time, the institute at Rangoon had been opened, and only the Assam cases came late. His figures were chiefly influenced by the second factor; i.e., the late arrival of persons bitten amongst whom one death from hydrophobia had occurred, i.e., persons at greater risk. In Major King's time, the Bombay and Shillong institutes had been opened, and the influence of distance had been practically eliminated; the curve shows a U form because all the badly bitten cases arrive early as they come from a short distance only, and the late cases are those only where a death from hydrophobia has occurred among the persons bitten; hence a selection occurs from natural causes, and the mortality rate is affected by these causes which have nothing to do with the treatment given, and therefore cannot be considered as a test for a cure.

TABLE II.

Year.	KASALI.		TOTAL.	COONOOR.		TOTAL.
	Treated.	Deaths.	Percentage.	Treated.	Deaths.	Percentage.
1900 — 1	321	10	3.1			
1901 — 2	543	13	2.4			
1902 — 3	584	12	2.1			
1903 — 4	612	10	1.6			
1904 — 5	877	12	1.4			
1905 — 6	1145	21	1.8			
1906 — 7	1308	19	1.5			
August-Dec- ember, 1907.	519	5	1.0			
1908	1389	26	1.9	182	3	1.69
1909	1937	28	1.4	340	2	.59
1910	2073	26	1.2	658	3	.46

TABLE II.

Year.	KASAUJI.		TOTAL.	COONOOR.		TOTAL.
	Treated.	Deaths.	Percentage.	Treated.	Deaths.	Percentage.
1911	2268	47	2.1	827	17	2.05
1912	3548	46	1.3	940	9	.95
1913	3980	48	1.2	1240	14	1.12
1914	4585	54	1.18	1293	20	1.56
1915	5046	72	1.43	1210	21	1.73
1916	5360	70	1.3	1490	14	.93
1917	5206	68	1.31	1707	24	1.41
1918	5680	69	1.21	2396	31	1.29
1919	6509	87	1.34	2975	33	1.10
1920	7506	75	1.0	3172	41	1.20
1921	7004	64	.91	3623	35	.90
1922	6673	67	1.0	3471	43	1.20
1923	7272	72	.99	3375	29	.8
1924	7852	61	.78	1834	1	.29
1925				489	7	1.43

Still a third way in which selection occurs from natural causes is that a treated population becomes increasingly diluted by persons who are not at risk. This is shewn in Table II, which gives on the one hand the percentage mortality at the Kasauli institute over a period of 25 years. On the other hand, the annual number of persons treated rose from 300 to 7,000. This means that with increasing knowledge of the facilities afforded by the institute, an increasing number of persons are treated and included in the figures who have been bitten by non-rabid animals. No medical man will take the risk of pronouncing whether the animal was or was not rabid, and so the patient is sent for treatment. In this way every Pasteur institute in the world comes to shew a steady diminution in its mortality rate, whether the treatment remains the same or not.

We see therefore that such natural selection may cause considerable variation in the population treated, as they are exposed to varying degrees of risk, and that this may greatly modify the results obtained.

Further, *exaggeration* is a not unnatural error among many medical men. One should make a careful note and written record of every case seen and treated; otherwise there is a great tendency to exaggerate the numbers seen. The ordinary honest person will unconsciously exaggerate about threefold, whilst others will multiply by ten or more. Whenever I hear a lecturer talking about the thousands of cases of this, that or the other disease which he has seen, without giving written chapter and verse for his statement, I always mentally take off the last digit of his figures. One's intentions may be strictly honourable, yet when one has seen a monotonous series of cases of a disease for years on end, there is a natural tendency to exaggerate. During the last five years I have collected written notes on approximately 500 cases of leucoderma, and, on an average, I have seen each patient about four times. Were I to trust merely to memory, I might easily think that I had seen about 2,000 cases. Such an error can only be prevented by making a written record of every case seen.

In addition to bias, the influences exerted by the law of random sampling, and exaggeration; still another factor comes into play, especially when dealing with protozoal diseases, and that is the risk of re-infection during the period that the patient is under observation. Little or no immunity is established in such cases, the specific drug given is eliminated from the body within a few days of cessation of treatment, and such persons may stand a very good chance of being re-infected when they return back to their own homes, and to the environment in which they contracted the original infection. I maintain that any tests to estimate the value of a cure for such diseases should not be carried out in an infective area, if this can possibly be avoided. Further, in connection with such diseases, there are certain seasons of the year when conditions are epidemic, such as the spring and early winter in malaria, and the monsoon months in kala-azar. A group of kala-azar patients discharged after treatment at the beginning of the winter would run but little chance of re-infection before the next rains commenced, whilst a similar group discharged during the early hot weather would run considerable risk during the monsoon which immediately follows.

Criteria in Testing the Cure.

We now come to the final test of the cure. The first point to ensure is that the composition of the two groups,—treated persons and untreated controls,—or persons treated by methods A and B respectively,—shall be *homogeneous*; otherwise the two groups will be dissimilar and the results not comparable with one another. The best way to ensure this is to place the patients as they arrive alternatively in groups A and B without selection. Even then, however, care must be exercised; otherwise by chance the first group may contain many early cases who have but little damage to the system, whilst the second group may contain many advanced cases which even the specific drug cannot cure, owing to irrevocable damage to essential tissues as the heart, etc.

Secondly, the number of persons in the two groups must be *sufficiently large*. Usually, in the common diseases, one tries to get 100 persons in each group, so as to get the percentage cure rate. A very common mistake and one which is a very bad one is to take small groups of three or six or nine patients, and elevate the results obtained into percentages. Three deaths out of six cases does *not* constitute a death rate of 50 per cent., as the next six cases may easily shew no deaths at all.

Having obtained figures from a sufficiently large and homogeneous population, mathematicians sometimes look upon the figures thus obtained as being perfectly accurate. One often hears the remark made that statistics can be made to shew the value of anything. In reality, figures only give us a guide to the formation of opinion. To interpret the results which we have obtained, we *must* have a full knowledge of the factors present, upon which I have dwelt. Having assessed their value and influence, and having carefully weighed up the pros and cons, we can then, and only then, pass our judgment upon the figures.

With regard to such factors, we must first eliminate the effects of *chance sampling*, by looking through the various data of our population and making certain that it is homogeneous. Usually, most observers do not give these essential data; they merely record so many cases treated or observed. If results are only slightly, and not significantly different, we can come to no conclusion; in such a case we must repeat the whole experiment again and see whether the slight difference is due to the remedy used, or whether it was the result of random sampling.

It is obvious, from what has already been said, that the differences between the two groups must be significant, and one beyond the range of chance sampling. Very few people appreciate what should constitute an *essential* or *significant difference*.

I may quote two examples to illustrate the meaning of a significant difference. In the case of a disease with a low mortality, say 1 to 5 per cent., if the cure is an efficacious one, it should eliminate almost the whole of this small mortality rate. On the other hand in a given Pasteur institute, the mortality rate among 3,000 persons treated in one year, may be 1.3 per cent.; the next year, among 4,000 persons treated, it may be 1.1 per cent. This difference is not significant, and upon investigation it will probably be found to depend upon the fact that the two populations compared are not similar to one another in some respect or other. The difference is not sufficient for the director of such an institute to claim that the treatment given in the second year was better than that given in the first year; some alteration in the composition of the two populations concerned will probably account for it.

Thirdly, we must understand what a *partial correlation* means. In many diseases the effect of rest, of improvement in the diet, of such drugs as act as tonics and raise the body resistance, is to improve the defence mechanism of the body. Such drugs do not act directly against the causative agent of the disease, but only inasmuch as they increase the patient's own natural powers of resistance. Thus we see that it would not be fair to compare the results of treatment of dysentery among in-patients with the results obtained among out-patients; the former have all the benefits of rest, nursing, and hospital diet, the latter do not.

Only when we have considered all these factors can we pass on to our judgment as to whether the difference between the two groups concerned is sufficient to warrant us in saying that the drug concerned is really a cure.

In passing, the case for rarer diseases may here be considered. When we are dealing with common diseases, it is easy to get large figures, and opinion can be based upon nothing else. But there are many rare diseases in which it would be impossible to obtain sufficient figures for a percentage in any one man's lifetime. In many such diseases, fortunately, we can rely upon the *chronicity of the infection*. To take an actual example, Plate 1 shows a case of a rare skin disease, *ichthyosis hystrix*, before and after treatment by the administration of desiccated thyroid gland substance.

were the result of only three weeks' treatment, whereas prior to treatment the disease had been slowly progressive in character. Similarly, I have recently had under treatment two patients whose lesions of the skin and mucous membranes corresponded to the clinical entity described as *xanthoma tuberosum multiplex*. The duration in one case had been sixteen years, in the other two years. Examination of films from the lesions of both patients shewed *Leishmania parasites*; and both cases cleared up completely with ten intravenous injections of von Heyden's Stibosan (471). In both these examples, the long prior duration and chronicity and progressive character of the disease, followed after treatment by immediate clearing of all lesions, is sufficient to enable one to say that the treatment adopted brought about cure. The rapidity of cure contrasts markedly with the slow progress and long duration of the diseases. Further, there are certain diseases that are at present known to be incurable and progressive in their course, such as paralysis agitans, tabes, and disseminated sclerosis. In such cases if one could arrest the disease entirely in only a few cases, it would be a sufficient guarantee that the drug had cured the disease; and that, in spite of the fact that whatever damage had previously occurred to the central nervous system would remain as a permanent injury, with its corresponding loss of function.

The Permanency of the Cure.

Proof that the cure is a permanent one lies in *time*. If the cure is a permanent one, the patient should continue for months or years to remain free from the disease, and in general good health. With regard to the value of the cure in the practice of medicine generally, the chief evidence of its value will rest in the *reduction in the incidence or in the mortality rate from the disease among the general population*. These two factors must always go hand in hand. Thus we know that the organic derivatives of arsenic introduced for the treatment of syphilis are curative from the point of view of immediate clearing up of clinical symptoms, and the change of the Wassermann reaction from positive to negative; but whether they really eradicate the

Plate 1.



Fig. 1.

A case of *Ichthyosis hystrix* kindly sent to me by Lt.-Colonel A. Denham White. The patient had suffered from the disease for 12 years. Photographs before and after three weeks' treatment with thyroid gland.

Fig. 2.

In this instance, the patient had had the disease for twelve years prior to treatment, and the results obtained

virus of syphilis from the body cannot yet be stated; if they do, then the incidence of tabes and of general

paralysis of the insane should shew a steady reduction in future years.

Cures and Non-Cures.

Even the universal acceptance of a cure as such by the medical profession in general cannot be taken as a guarantee that the cure is really efficacious. One must subject its claims to the most rigid scrutiny; one must study its effects on the mortality rate from the disease or its effects in the reduction of the incidence of relapses. Let us take three "cures" which are to-day universally accepted by the medical profession as such; viz., emetine, antivenene, and anti-rabic immunisation by vaccine.

(1) Emetine is a cure for amœbic abscess of the liver. In Chart I we see that, since the introduction of emetine in the treatment of amœbic abscess of the liver, the mortality rate from this disease amongst the British and

intestine, however, is a matter which must be held to be still *sub judice*; there can be no question of its great clinical value in amœbic dysentery, but whether it will totally eradicate the infection of the bowel is doubtful.

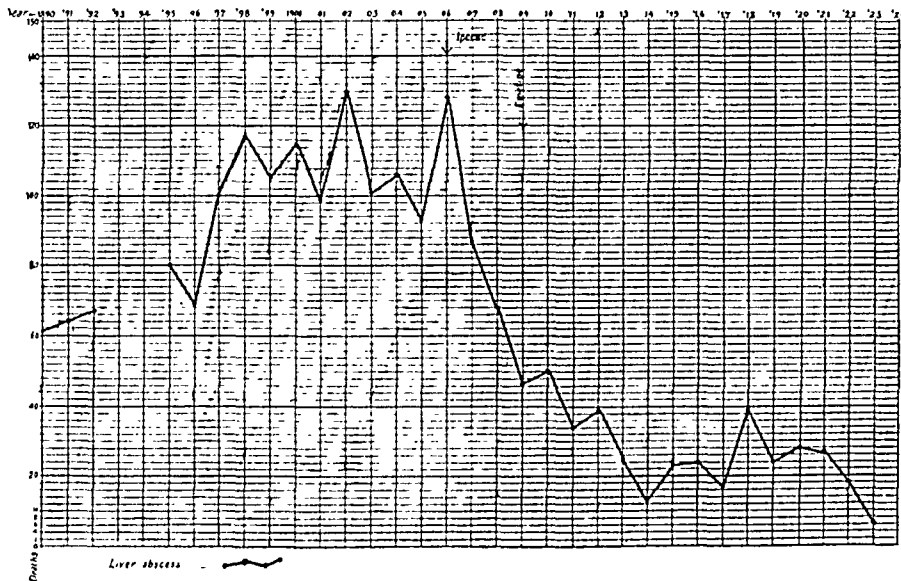
With regard to liver abscess, we have here an example of a proved and reliable cure.

(2) Calmette first introduced antivenene in about 1896, and, as far as I can find out from the literature, it first became a standard remedy for the treatment of snake-bite in India about 1900 or 1901. In Chart II is shewn graphically the number of deaths from snake-bite recorded by the Public Health Commissioner, India, for the years 1890 to 1923.

We see at once that, in spite of the introduction of antivenene, the total number of deaths from snake-bite per annum in this population has remained more or less

CHART I.

OBSERVATION.



Shows the total number of deaths from liver abscess in the British Army and families, Indian Army and Jails, from the years 1890 to 1924. Ipecacuanha treatment in 1906 by Sir Leonard Rogers for hepatitis, and Emetine in 1909.

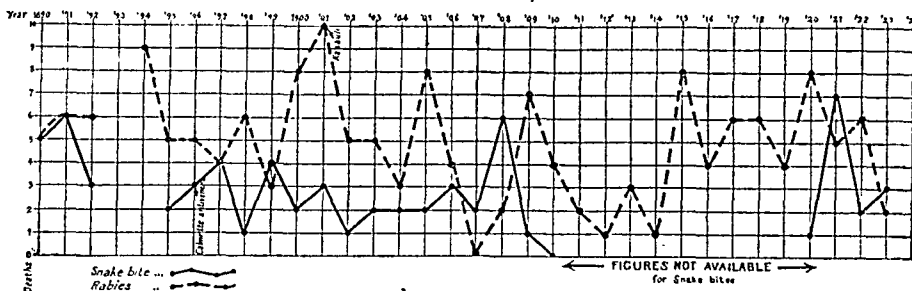
Indian armies in India, and the jail population—figures for populations carefully observed by competent medical men over decades together—has fallen from 130 deaths in 1890 to 6 deaths in 1923. Not only is there abundant clinical evidence that emetine cures amœbic abscess of the liver; its effect upon the mortality from that disease in populations under skilled observation has been most striking.

the same; there has been no significant difference since the introduction of antivenene.

Why is this? Also why is it that antivenene appears to be an almost useless remedy in medical practice? We can easily prove in the laboratory that antivenene neutralises the venom of both the cobra and the Russell's viper, both *in vitro* and *in vivo*.

Major Knowles and I shewed in 1914 that, although

CHART II.



Shows the total deaths from snake-bite, and from hydrophobia in the British Army and families, Indian Army and Jails, from the years 1890 to 1924. Calmette's discovery of Antivenene in 1896. First Pasteur Institute of India opened at Kasauli, August 1900.

This result is also shewn graphically in Chart I, and the evidence is conclusive. Whether emetine is also an absolute cure for *Entamoeba histolytica* infection of the

1 c.c. of fresh antivenene will neutralise 1 mgm. of desiccated cobra venom *in vitro*, yet *in vivo* 1 c.c. will only neutralise 0.4 mgm. in experimental animals.

Further, antivenene steadily loses its potency when stored anywhere except in the ice chest. We further shewed that the average venom content of the glands of a cobra is about 207 mgms. of desiccated venom and the cobra can give at a good bite some two-thirds of this amount, an amount equivalent to about 138 mgms. of desiccated venom. To neutralise this amount of venom in the body, not the usually advocated dose of 20 to 30 c.c. of antivenene would be required, but some 200 to 400 c.c. administered intravenously. Such a dose may perhaps verge upon the toxic limit for the serum itself. The fact is that antivenene is a weak product, and that one of the most interesting problems in tropical medicine to-day is to discover some method of concentrating it. If a Professor of Biochemistry is ever sanctioned for the Calcutta School of Tropical Medicine I trust that he will give his attention to the question of trying to discover a really effective treatment for the bites of poisonous snakes.

(3) I do not desire here to enter into a discussion of the value or otherwise of anti-rabic treatment as practised in every Pasteur institute in India. The views of Colonel Harvey and myself, and the large volume of evidence in favour of such views, have previously been published. We regard the treatment as being only slightly, if at all, efficacious. In Chart II is shewn the mortality from hydrophobia among a population under skilled medical observation,—(the British and Indian armies and the jail population of India)—for the years 1890 to 1923. It will be seen that, despite the opening of one Pasteur institute after another, and despite the widespread issue of antirabic vaccine in the *mofussil* of recent years, the mortality rate has remained approximately constant over the whole 33 years. The difference is not significant.

In these three instances we have examples of

- (a) a cure which is undoubtedly efficacious,
- (b) a cure which is of value but which is administered in inadequate doses, and
- (c) a "cure," the value of which is doubtful.

The Relative Merits of Different, but Closely Allied Remedies.

We have seen how difficult it is to estimate the value of a cure. We may now pass to the consideration of an allied problem, where we have to decide upon the relative merits of two cures which give somewhat similar results. Here what we have really to decide is whether the difference between the results with the two cures is or is not significant. Since Ehrlich and Hatta discovered the value of *salvarsan* in syphilis we have seen a struggle going on in the medical profession between the advocates of this, that and the other organic arsenical preparation in the treatment of syphilis. At present we do not know whether any of these arsenical derivatives is or is not capable of exterminating the spirochæte of syphilis from the body system. A similar phenomenon is to-day occurring in India among the advocates of the several different preparations of pentavalent antimony for the treatment of kala-azar.

In such a connection I can only quote my experience in malaria with the different alkaloids of cinchona bark. The order of merit in which I found them to be efficacious in the treatment of benign tertian malaria was as follows:—

- Quinidine.
- Cinchonidine.
- Cinchona febrifuge (residual alkaloid).
- Quinine.
- Cinchonine.

My figures for some of the groups were small; also they had been subjected to the errors of random sampling. Further, a factor which was unexpectedly introduced was that, as soon as the Armistice of 1918 was signed, many of my patients, all of whom were British soldiers under treatment at Dagshai, being anxious to rejoin their units and be demobilised, started to buy quinine in the bazar and to take it in addition

to their standard treatment. I was only able to stop this practice by buying up all local stocks of quinine and storing them beyond their reach.

On the other hand, I found that these alkaloids differed in their effects upon gastric and peptic digestion, and in their pharmacological effects. They hindered gastric and peptic digestion in the following order, taking the most toxic first:—

- Cinchonine
- Quinidine
- Quinine
- Cinchonidine,

whilst the order in which they produced a fall of blood pressure on intravenous injection, taking the most active first, was as follows:—

- Quinidine.
- Quinine.
- Cinchonine.
- Cinchonidine.

From this it is obvious that, although quinidine has the most powerful parasitocidal action, yet on account of the fall in blood pressure which it produces, and its inhibition of gastric and peptic digestion, it cannot be the alkaloid of choice. The merits of the different alkaloids must be considered, not only with reference to their body activities as blood parasitocidal value, but also with reference to their effects upon blood pressure gastric and peptic digestion.

Similarly, when one is considering the relative merits of drugs with very similar therapeutic results, one must not only estimate the therapeutic efficacy of each, but their suitability for administration, their price for the patient, and their actions upon the body activities. A drug which seems the drug of choice from its parasitocidal action may not necessarily be the drug of election. One would naturally choose the least toxic drug, if its parasitocidal action is almost the same as the others.

* * * * *

The subject which I have introduced for discussion this evening is admittedly a difficult one. Yet it is very necessary that our ideas upon it should be clarified; that rational and critical enquiry should replace credulity.

Conclusions and Summary.

1. Cures may be of two kinds, permanent or temporary. In the latter condition, the causative agent of the disease is still present, but not in sufficient numbers to give rise to symptoms.

2. Permanent cures may occur with complete recovery of the tissues, or may be incomplete with impairment or loss of function.

3. In every test of a cure, the data of composition of the population tested should always be given as regards its important ætiological factors such as age, habits and customs, etc., since these factors may profoundly influence the course of the disease.

4. The two populations compared, those under test and the controls, should be similar in every respect; e.g., with regard to numbers, homogeneity, etc.

5. The percentage mortality or cure rate is obtained by observations on 100 individuals; not by elevating observations on digits into percentages.

6. A homogeneous population under test can only be secured by avoiding bias, and paying attention to the law of chance sampling.

7. The testing and control experiments should be carried out under identical conditions in order to avoid obtaining the results of only partial correlations. Also tests for a cure should if possible be carried out in non-infective areas, with regard to protozoal diseases, especially, in order to exclude the chances of re-infection.

8. Only differences between the two groups of a significant order should be considered; e.g., those outside the range of chance sampling, or partial correlation.

9. The permanency of a cure can only be tested by time, the continued well-being of the patients, and the effect of the introduction of the cure on the mortality rate for a given disease in the general population.

10. In cases of rare diseases, where large numbers of observations are not possible, one has to rely on diseases which shew chronicity before treatment, large mortality rate, and the rapid disappearance or arrest of the diseases when under treatment.

11. The relative value of a modification of treatment,—e.g., of the comparative value of the dry cord method and the dilution method of Hoghyes in anti-rabic treatment, or of the different pentavalent compounds of antimony in the treatment of kala-azar, can only be tested on a large scale. Consideration must also be paid to the relative toxicity to the body of the different compounds used, apart from their therapeutic value.

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Discussion.

In the discussion on Major Acton's paper

Major R. Knowles, I.M.S., thanked Major Acton for his most interesting paper, on behalf of the Society. He trusted that it would receive early publication and wide publicity, for it was very badly needed and very appropriate to the time. He supposed that every medical man in India suffered as he did from the attempt of the manufacturing chemist to try to dictate to the doctor his methods of treatment. These descended upon his office table by every English mail, not a few samples of drugs judiciously chosen, but whole waste-paper basketfuls of samples and of highly laudatory literature from German, French and English sources. A perusal of this literature had led him to the conclusion that the less a doctor knew, the better for his practice. Armed with a Japanese hypodermic syringe and his weekly supply of samples and instructions, he could treat and "cure" everything. Some firms followed ethical methods, and their wares were beyond suspicion; others did not. Someone had to pay for all this enormous advertising, and he thought that in the long run it was the patient who paid. The new remedies were not only on trial, they were often costly. We were asked to abandon the use of quinine and the cinchona alkaloids in the treatment of malaria, the value of which had been proved by centuries of clinical experience, in favour of six or seven new absolute cures for malaria; of emetine; with its proved and admirable record, in favour of a dozen or so new cures for amœbiasis. And when one came to examine the literature in favour of some of these new remedies, one found here a paper dealing with three cases, another with five, another perhaps

with seven, with no after-history of the patients recorded, and no attempts made to follow them up, or to carry out the repeated laboratory examinations necessary.

Dozens of instances could be quoted of the credulity of the medical profession with regard to "cures." Thus when he and Major Acton had been working on snake venoms in Kasauli in 1913-14, a correspondent in Kashmir had sent them a plant root with which he claimed to have treated all cases of snake bite seen in 30 years of medical practice in Kashmir without a single death. The fact, however, was that the poisonous snakes of Kashmir were all small vipers, and probably there was not a poisonous snake in Kashmir capable of injecting a lethal dose of venom into man. It was upon this sort of evidence that the reputation of many of the so-called snake bite cures rested—including, he was sorry to say, the Lauder-Brunton lancet. Had the correspondent treated all his cases with ginger beer, or followed the more traditional method of giving his patients sufficient alcohol to enable them to see again the snakes which bit them, his results would probably have been the same.

There was no cure for dengue; it could only be endured. Yet one could make out a splendid case for quinine or any other drug as a cure for dengue, and the other short term fevers of India. One had only to administer the drug in large doses as the temperature was falling, and then claim that the cessation of the fever, which was due to the self-limitation of the disease, was due to the drug. An error which was widespread among the medical profession and which was particularly pernicious was the use of vaccines on a large scale during the decline of an epidemic. If, for example, one took a cholera or an influenza epidemic when it was at its height, and when it was about to decline from natural causes, and indulged in wholesale vaccination of the population, whether subcutaneously or by oral vaccines, one could then attribute the decline and cessation of the epidemic to the use of the vaccine, whereas its use might not have really affected the situation at all. On the other hand, with regard to pneumonia at least, the recent careful work of Major Sinton among Indian troops in Baluchistan had shewn that anti-pneumococcus vaccine was a failure. When given to large bodies of troops shortly before their exposure to the infective winter season it did not significantly affect either the incidence or mortality rates.

He had seen a good example of the uncritical spirit only that morning in a veterinary journal. An observer claimed that he had cured six cases of dumb rabies in dogs by the administration of large doses of thyroid gland; but failed to state upon what evidence the diagnosis of dumb rabies was based. There were several other diseases in dogs which might simulate dumb rabies. In the case of a seventh animal so treated, death followed, and Negri bodies were found in the brain; that animal had dumb rabies all right, but the "cure" was ineffectual.

The medical profession in India looked to its teachers to teach what was true, and to sift out what was false. Men who were teaching medicine had a duty to their students. Yet he did not think that he had seen a single case of dysentery due to Flexner's bacillus within the past five years which had not received numerous injections of emetine. Major Acton and Major Chopra, in their work of the past five years, had let in a whole flood of light into therapeutics in tropical medicine. The clinician might be content with knowing that a drug was of benefit in a given disease, but the investigator could not stop there. He must know how, where and why the drug acts. Only in the light of such knowledge gained could therapy be improved; it was like any other science, it must have a rational basis. Hence when Major Acton said that the most important thing about any drug was to find out how it acted, he agreed with him. In many ways Ehrlich's great idea of the *therapia sterilans magna* was a mistake; for decades the medical profession had followed that chimera. With regard to protozoal diseases at least, the action of all

these drugs appeared to be an indirect one. In the long run it was patient *versus* parasite, and we had paid far too little attention to the patient; far too often we had striven to kill the parasite, at the expense of the patient. It was time to investigate whether we could not do more to help the patient to win his own battle against the parasite.

Dr. C. L. Sansom, C.M.G., F.R.C.S. (Ed.) (speaking as a medical administrator with many years' experience), said that he had suffered throughout the whole of his official career from the fallacies in vital statistics. However carefully they were collected, they were only too often unreliable. For instance the population of one mine on the Rand was formerly about 1,000. Later, the incidence of miner's phthisis has shewn a remarkable increase; investigation shewed that the percentage incidence had been calculated on the supposed basis of 1,000 population, but that in the meantime the actual population had grown to 1,400. However honestly the figures were collected, they were subject to unexpected fallacies. He wished that Major Acton or someone in authority would devise printed instructions as to the proper precautions to be taken in collecting evidence with regard to medical statistics of all kinds. The medical profession had to a certain extent itself to blame for the ever-changing fads and fashions in medicine; he could recall the time when it was almost criminal not to prescribe sour milk for any and every disease; but to-day the Bulgarian bacillus was almost unheard of. The floods of new preparations on the market, instead of helping the doctor, led him into confusion. Major Acton's paper might at least do something to clear the air.

Major K. K. Chatterji, F.R.C.S., said that the venereal diseases offered a wide scope for unjustifiable conclusions as to the results of treatment. Reputed "cures" for gonorrhœa were legion; but how often did one see cases where a "cured" case relapsed, or ran a chronic posterior urethritis after he was supposed to be "cured." The same was true of syphilis; he had seen many cases where "cure" was supposed to have occurred, but the fact that there had been no final cure was shewn by the occurrence of a specific iritis or other similar lesion. Cancer was a third instance of a disease where it was often impossible to say whether the patient was really cured or not. It was possible to follow up patients in Europe; but in India it was very difficult, next to impossible in fact.

Dr. G. Panja pointed out how climatic factors affected endocrine activity. The personality of the physician often really played a part in cure; whilst the mentality of the patient also had to be considered; some patients insisted on having injections, they had no faith in any drug by the mouth; if one gave them injections—of anything—they appeared to improve. Time of the year was an important factor in the treatment of skin diseases; folliculitis tended to disappear in winter and recur in summer, as also did psoriasis. He had known patients attending the skin clinic at the Calcutta School of Tropical Medicine for some five years on end, disappearing in winter when their lesions were better, and returning in the summer when they recurred.

In replying, Major Acton agreed with Dr. Sansom as to the unreliability of many statistics. For instance in military medical circles, he had known many instances of enteric fever diagnosed as pyrexia of unknown origin; a confirmed diagnosis of enteric meant that the medical officer in charge had to send in about eight different detailed reports, whereas pyrexia of uncertain origin passed unremarked. He had once seen a questionnaire sent out in connection with prophylactic quinine, it contained about 60 questions, each requiring detailed answers; who was going to take the trouble to sit down and answer it, and what would be the value of the information so collected? In connection with skin diseases, reinfection was very commonly seen in the ringworms, when cured persons went back to houses infected with the spores. The nervous system of the patient materially affected the course of such diseases as espe-

cially affected the face or spoilt the appearance; such patients worried especially about their appearance, and the worry reacted on their defensive mechanism; on the other hand when they found that they were improving, improvement was rapid because of their ceasing to worry, and becoming optimistic.

A STUDY OF SUPRA-PUBIC LITHOTOMY.*

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Of the various methods of operation for vesical calculi, the choice rests between litholapaxy, perineal lithotomy, or supra-pubic lithotomy. The last, I think, is preferable, because it is less beset with danger, and the most convenient operation in children.

Absolute Indications for the Operation.

1. Very large or very hard stone.
2. Fixed or encysted stone.
3. New growths of the bladder, complicating calculus.
4. Vesical calculus associated with an enlarged prostate or with extensive suppuration.
5. Urethral stricture or a narrow meatus which cannot be properly rectified.

Diagnosis.—Among subjective and objective symptoms one may mention heaviness in the region of the bladder, tenderness, difficult micturition, interrupted flow, or momentary stoppage of the urine. Pain is often a prominent feature;—chiefly, at the end of micturition, and the condition is often associated with hæmaturia, prolapse of the rectum, sometimes with an elongated prepuce. Pain in the penis is often a marked symptom; I have seen boys suffering from vesical calculus pressing the heel of the foot against the perineum, especially when in bed, shuddering at the idea of micturition, or jumping and whirling about, squeezing the penis with the utmost force downwards with an action like that of milking a cow, passing their urine drop by drop,—sometimes faeces also,—and crying aloud the whole time. Whilst such symptoms are extremely suggestive, yet the diagnosis can only be confirmed by thorough exploration of the bladder. Examination with a sound sometimes fails; especially in the case of small or flat stones. I have known a case where several examinations with a sound, made upon different occasions, failed to detect the presence of a stone; yet operation was decided upon on the strength of the symptoms alone, and supra-pubic lithotomy demonstrated the presence of a stone. Wherever possible, x-ray or cystoscopic examination should be carried out.

Preparation of the patient.—This is a most essential part of the procedure, as failures often result, not so much from want of skill on the part of the surgeon, so much as from want of proper preparation of the patient. On admission

* An abstract of a paper read at a meeting of the Nepal Medical Association, under the presidency of Lieutenant-Colonel J. B. D. Hunter, O.N.E., I.M.S., Legation Surgeon, Nepal.

the patient's urine should be thoroughly examined and any abnormality of the urine corrected by medicinal measures. Operation should not be undertaken so long as the urine is foetid, or if there are signs of cystitis, especially acute cystitis. If such conditions be not corrected, the result of operation will be a septic, non-united wound, or a fistula which will take a very long time to heal. A surgeon's duty is not to operate early, but to operate with a view to cure, and one cannot insist too strongly upon the need for previous thorough examination and medicinal treatment of the patient. But should such treatment fail to clear up the condition, and where the cause of the condition is clearly stone, it is better to operate and not to wait but to operate and remove the stone which is the source of irritation, and then to drain the bladder both from above and below.

The abdomen and pubes having been shaved, the patient is given a tepid bath with antiseptic soap a couple of days before operation. A dose of calomel or castor oil should be given the day previous to operation, about two hours after breakfast, followed by a soap enema the same afternoon, and an antiseptic dressing applied before going to bed. Nothing should be done or given on the morning of operation.

Operation.—Most surgeons recommend the "Trendelenburg" position. Sir Holburt Waring advises the surgeon to stand on the left of the patient, while the late Sir F. Treves advocates the right position. This is purely an individual liking; personally I prefer the right position.

Distention of the bladder.—Generally, a soft catheter is used for the purpose of distending the bladder; but I am in favour of a metallic one. With the soft variety there is no extra advantage except distention of the viscus; while with a metallic one we have all the advantage of a soft one, plus the knowledge it affords as to the position and depth of the organ, and guidance for the knife in opening the bladder. It is not to be wondered at that sometimes a surgeon, mistaking inflated intestine for the bladder, may open the same, or going astray from the middle line (sometimes the bladder itself may be deflected to one or other side by weight or pressure, or be abnormally situated) opens the peritoneal cavity by cutting down at the extreme right or left.

The bladder having been first emptied and then washed out three or four times with warm boric lotion ($\frac{1}{2}$ an ounce to a pint), or a solution of silver nitrate (1 in 2,000), is distended with normal saline. The quantity to be injected varies with the age of the patient and the condition of the bladder. "A good plan" writes Dr. J. F. Binnie, "is to test the capacity of the bladder before any anæsthetic is administered, and act according to the knowledge gained." I found on an average that 2 to 5 ounces for children, and 8 to 12 ounces for adults are sufficient. Treves speaks highly of the injection

being carried out by means of an irrigator, as giving a continuous flow. In using an irrigator the height should not exceed 18 inches, and the pressure in the vessel should not be more than that of a pint of the solution, and a graduated glass apparatus proves useful. If you use a syringe, it must be of glass and with a capacity of 4 ozs.; but no matter what you use, every part of it must be thoroughly sterilized, together with the lotion to be injected, and the oil for lubrication. At the same time, all air should be expelled from the syringe or douche tube before it is attached to the catheter. The distention should be carried on *very slowly*, and when the dullness reaches a height of 2 to 3 inches above the pubis, the patient is ready for operation. In the case of a soft catheter, it should be removed and the penis tied round its base with a piece of rubber tubing. Some surgeons recommend distention of bladder with air; but this is dangerous, and several catastrophes due to air embolism have been recorded. Again, some plead in favour of inflating the rectum in order to bring the apex of the bladder into apposition with the abdominal wall and prevent it from collapsing into the pelvis.

Line of incision.—There are two methods: One is Kocker's transverse incision about 4 inches long "from one abdominal inguinal ring to the other" (Thomson & Miles), a little above the pubes and with a slight convexity downwards. The other, a vertical one 3 to 4 inches in length "commences about half an inch below the upper border of the pubic symphysis, and extends upwards towards the umbilicus" (Waring). Kocker's method is followed only when the calculus is believed to be very large, or when a previous cystotomy has been performed.

Dissection.—The fascia and aponeuroses of the external and internal obliques and transversalis having been divided in the same median line, the knife comes upon the fleshy fibres of the pyramidalis and rectus muscles, which are separated very gently by the handle of the scalpel or by a clean cut strictly in the middle line, and kept apart by means of suitable retractors. If the muscles are bulky and powerful, Waring advises an incision to be made "transversely in the line of the pubic crests"; Binnie separates the recti, pyramidalis and the linea alba from the bone; while Thomson and Miles "cut across about an inch above the pubic attachment." I follow the last method, as it affords better facilities for stitching up the severed muscles than do the former. Next, the transversalis fascia comes in view; this is apt to be cut along with the muscles, or mistaken for the outer coat of the bladder. This part of operation must therefore be neat and clean and not done rashly. All blood-vessels should be carefully secured, and the wound must be quite dry, though most surgeons assert that bleeding ceases as soon as the bladder is opened. Next, the thin layer of extra-peritoneal fat is exposed. "Hook the finger

behind the pubis," Binnie advises, "and pull upwards the pre-vesical fat, and with it the vesical fold of the peritoneum." The left gauze-covered index finger is used to dislodge it upwards out of the way, until the bladder is displayed.

Management of the peritoneal reflexion.—The golden rule is to reflect the layer of extra-peritoneal fat upwards as far as possible, by gauze dissection and to keep the knife below the fold with its cutting edge downwards. Protect the upper angle of the wound with a gauze plug, and keep the patient in the Trendelenburg position, in order to raise the pelvis so that the intestines may fall away from the bladder. But, if the peritoneum is injured, do not open the bladder before completely suturing the slit in the peritoneum. If the suture is satisfactory, I complete the operation the same day; but if doubtful, I leave in a drainage tube, and usually after three days, if every thing goes well, I finish the rest of the operation.

Recognition of the bladder.—It has a brown or pinkish colour, a rounded outline, and the longitudinal striæ of its outer coat are essential points for recognition, and no surgeon should lose sight of them; yet, in actual operation they are not at all trustworthy. I never depend on my eyes only, unless corroborated by other senses as well, but feel the outline of the bladder, and ask my assistant to push the catheter up in the centre, against the apex, until it touches my finger, this giving one an approximate idea of the thickness of the bladder, or of other structures intervening in between. In doubtful cases I puncture the bladder with a fine needle in the middle line until the point touches the stone, or a fine jet of water comes out and clears the situation.

Fixation of the bladder.—If the bladder is not fixed, or the fixing points slip off, there is much difficulty in readjustment. It is no good poking at each structure in turn to find out the edges, but a safer and quicker method is to introduce a pair of closed toothed peritoneal forceps into the bladder and secure them on each side of the bladder wall. Some surgeons use hooks; and some thread tractors, which are more convenient than forceps—which "impede further operative work." I apply two strong silk ligatures with a full-curved round needle, piercing *all the coats*,—one on either side, about an inch apart, near the lower segment of the bladder. The upper point is always before one's eyes, and accessible, but it is very difficult to secure the lower one; whereas the success of the operation depends on the fact as to how you close the wound in the bladder. And if the suture is imperfect and left as such unnoticed, the condition will not only prevent a primary union, but thereby leave the chance of delayed healing also, if not of extravasation.

Opening of the bladder.—The assistant pushes up the catheter against the apex, exactly in the middle line, and then you can cut the bladder either against it, or below it, as you like. There

are two methods, one by a quick stab with one stroke, and the other by repeated strokes. The opening should be made with a very sharp scalpel with its edge directed downwards, between two lateral fixation ligatures, which must be held in slight tension. Make the opening big enough for a single finger, and pass your left index finger into the bladder before the fluid is poured out, in order to ascertain the size, number, position and condition of the stones. Next, enlarge the wound first above, and then below, if necessary. All surgeons advise making the opening into the bladder as large as necessary, rather than too small. The mucous membrane of the bladder is very loose, so you should cut from within outwards, with a drawing motion, holding the probe-pointed bistoury slantingly. Do not use a sharp-pointed knife, as it may puncture the bladder on the opposite side. Finally, remove the catheter.

Delivery of the stone.—Your assistant holds up by means of thread tractors the edges of bladder apart and upwards; you glide your left index finger, and with it the lithotomy scoop or forceps into the bladder. Do not catch the stone haphazardly, and try to remove it by force. With your finger manipulate the stone in such a way that (a) the shortest diameter falls at right-angles to the line of incision; (b) the middle diameter is in the line of incision, and parallel to it; (c) the longest diameter is in the line of traction. In difficult cases the seizing of the stone is greatly facilitated by the assistant passing his left index finger into patient's rectum from the left side, and lifting up the bladder and manipulating the stone from below. Treves speaks of the two forefingers of the left hand being employed "forceps-wise" in the extraction of calculus. I have tried this with advantage in conjunction with a scoop. Try to keep the bladder as full of fluid as possible, otherwise the bladder will contract and hold the stone so tightly as to make the introduction of the blades of the forceps difficult. Again, there is a risk of catching the rugose bladder wall with the stone. So, on catching the stone, move it gently from side to side and from before backwards; and if nothing obstructs you, you can safely pull the stone out. If there be more than one stone, remove the smaller ones first, then you have freedom of space in which to deal with the bigger ones. In case of abnormally big stones, Binnie suggests two methods: (1) Sub-periosteal excision of the part of the pubic bones; (2) "fragmentation of the stone *in situ* by means of a chisel lightly struck by a mallet,"—especially applicable when the stone lies in a diverticulum. If the stone is encysted, pass the left index finger into the rectum, and then dig your right index finger into the bladder and try to enucleate the stone. If unsuccessful, use the scissors curved on the flat instead, dislodge and remove it in the usual manner. There is a close analogy between the forceps-delivery of a foetus and of an encysted stone.

Suture of the bladder.—The following conditions contraindicate suture of the bladder:—

(1) If the urine is septic or purulent; if there is severe cystitis; when the kidneys are affected—pyelonephritis;—or when there is obstruction in the urethra.

(2) If bleeding is going on in the bladder, and clots of blood are forming inside; if the bladder-wall has been very much contused or its margins bruised or lacerated.

Suture the bladder from below upwards, both in relation to length and depth. Pull up the upper extremity with a blunt hook so that the edges of the wound become parallel to each other. Treves advises interrupted sutures, one layer for the mucous membrane and another for the muscular coats; but the majority of surgeons use overlapping Lembert sutures. Jacobson recommends the Connell suture. I have found the Connell suture the most efficient. Catgut is used by most surgeons, as the suturing material. Later authors recommend a full-curved round needle without cutting edges, and catgut hardened to resist absorption for three weeks. The needle-holder should be freely used, and the sutures must be applied as close as possible. In order to test the bladder, inject very slowly through a soft catheter some sterilized water, say, 3 to 4 ozs. into the bladder and notice if there is any leakage. If so, stitch up the particular spot; if still unsuccessful, leave a drainage tube in at the lowermost angle.

Supra-pubic drainage and catheterization.—In a hopeful case close the bladder, but leave a small drainage apparatus in, a rubber tube or a wick of gauze to drain the pre-vesical space. In less hopeful ones even, do not keep the bladder totally open, but stitch the opening above or below, or both ways according to the damage done, and leave a tight-fitting drainage, making a water-tight joint reaching up to the floor of the bladder, and connected by the external end by means of a T-shaped glass tube with Cathcart's siphonage apparatus. Jacobson, however, asserts that the wound does well and heals better without any drainage apparatus at all. In open wounds dressings must be changed every two hours, or as often as wet. I use a many-tailed bandage to facilitate the change of dressings.

Then comes the question of catheterization. Waring urges that a "soft catheter must be passed into the bladder through the urethra and kept there for a few days so as to allow the urine to escape as soon as secreted and to prevent distention of the viscus and consequent separation of the margins of the bladder wound." Catheterization every two hours may do, but the risk of this repeated procedure even under antiseptic precaution is great. Jacobson keeps the catheter in for five days, and when it is removed the patient is encouraged to pass urine every two hours regularly until the wound heals up. A long tube is attached either to the siphon or catheter to conduct the urine into a bottle, which

is filled with carbolic lotion (1 in 40) to a depth of three inches, and changed and cleaned twice daily, and the rubber tubing boiled once every morning. Negligence in these small matters often leads to sad results. One word about the catheter; it should be as thick as possible, and not loose; and its eye a big one.

Closure of the wound.—As soon as the opening in the bladder is closed, the superficial wound is washed out with a view to removing all fragments of the stone. While filling the outer cavity with the lotion with the catheter in the bladder, if the fluid remains stationary probably the suture is all right; but if it sinks down, the suture is not water-tight. In that case you must leave in a drainage tube. I stitch up the muscles and fascia in one layer with No. 3 catgut and the skin with silk-worm gut.

After-treatment.—Before the patient is removed from the table, the catheter is fastened to the penis by means of a strong silk thread which is tied to the catheter, its two ends being carried back on either side of the penis, and fixed to its neck by a few strips of sticking plaster around it. The end of the catheter is closed by pressure forceps. Then the patient is removed to bed and kept on his back. In old and debilitated patients Fowler's position is preferable. The end of the catheter is then fixed to a drainage tube. The nurse must inspect this bottle every hour to see if there is any obstruction to the flow of urine. If it becomes blocked she should send for the medical officer on duty at once. Sometimes a little squeezing of the tube will produce the flow; if not, the catheter should be removed, rinsed through, boiled, lubricated and replaced. The stitches are removed on the eighth day. Some of my cases after union supplicated again; I think that sepsis, over-distention of the bladder through slipping down of the catheter or its too early removal, or any condition causing intracystic tension, such as persistent cough, obstinate diarrhoea, either alone or combined, account for the failure. I have noticed as soon as the bladder is united and its power of propulsion is regained that urine dribbles or forces its way out through its lumen, as well by its sides too. This is a sure sign that the time is ripe for removal of the catheter. Often I find patients developing bronchitis or pneumonia on account of hypostatic congestion of the lungs; so the patient should be placed in a reclining position as soon as his condition allows, at least for a few hours daily.

Diet.—Give plain milk, milk and barley-water, or milk and soda-water for a day or two; and then, if everything goes well, soft rice or rice gruel, milk, vegetable soup, *dal*, etc., may be given. Fruit juice is very nourishing and soothing. Broths are useful in the later stages. If there be no other complication, solid food may be allowed after four or five days, in small quantity. Ordinary simple diet is far better than

a large quantity of unaccustomed liquid food which only upsets the digestion.

Complications and their treatment.—Amongst others I have met with the following complications; high or long continued fever, cellulitis, hæmorrhage, septicæmia or pyæmia, peritonitis, suppression or extravasation of urine, bronchitis or pneumonia, obstinate diarrhoea or dysentery, delirium or temporary mania, urethritis or cystitis, hydro- or pyo-nephrosis, orchitis or epididymitis, bed-sores and long-standing sinus.

It is not possible within the scope of this short article to deal with the treatment of every one of them; I shall only describe the most important ones. Treat the condition according to its cause and symptoms; but always remember the old saying "prevention is better than cure." In threatened sepsis or septicæmia antistreptococcal serum (polyvalent) must be employed in 10 c.c. doses, and repeated in severe cases 3 to 4 times in 24 hours. If the temperature is very high or the patient comatose, or with a large quantity of pus in the urine I do not hesitate to open the stitched bladder even, and drain from above and below in order to save life. A dry cough without expectoration must be checked at once by a sedative linctus. I got admirable results with tinctura camphoræ co. in warding off attacks of bronchitis. Bed-sores are a bad complication, and in protracted cases precautions against them must be taken. Use circular pads or air-cushions, keep the parts clean, have them rubbed with spirit daily, and dusted with zinc and starch powder. In extravasation make free incisions and use boracic compresses repeatedly. Irrigation with hot water stops ordinary bleeding, but if it persists, packing with gauze soaked in adrenalin solution may be necessary. Calcium lactate, Coagulen-Ciba or Hæmoplastin (P. D. & Co.) are useful in obstinate cases. Brandy and stimulants should be started as soon as the tongue is dry or if there is much exhaustion.

THE "PALLANG"; A DYAK CURIO.

By Dr. CHARLES LANE SANSOM, C.M.G., F.R.C.S.
(Edin.), M.R.C.S. (Eng.),
Formerly Principal Medical Officer, Federated Malay States.

THE following notes are on a subject which is perhaps of anthropological rather than of medical interest. Yet they may interest readers of the *Indian Medical Gazette*, and it would be interesting to know whether any similar custom prevails among any of the aboriginal tribes of India.

The "pallang," illustrated in fig. 1, and shewn as worn by all male Dyaks in fig. 2, was given to the writer by a Kayan of the Dyak tribe inhabiting the watershed of the Baram river in Sarawak. When manhood is reached, the sharp end of the "pallang" is thrust through the glans penis and

the knob fastened on. The instrument is then turned daily until the artificial channel heals, and it is subsequently only removed in order to cleanse it. As far as could be learnt this ornament is not used as a sexual stimulant—(although it was stated that no woman of the tribe

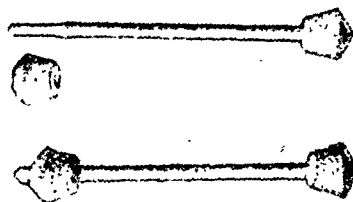


Fig. 1. "The Pallang" Actual size.

would marry a man without a pallang)—and it is hardly conceivable that such an instrument could add to the pleasure or gratification of either sex. The more probable explanation is that the custom has survived from a very ancient phallic or sun worship era when procreative energy was of supreme importance, as large families meant stronger tribes. The wearing of penile ornaments has been mentioned by ancient writers in Europe and other places and it is

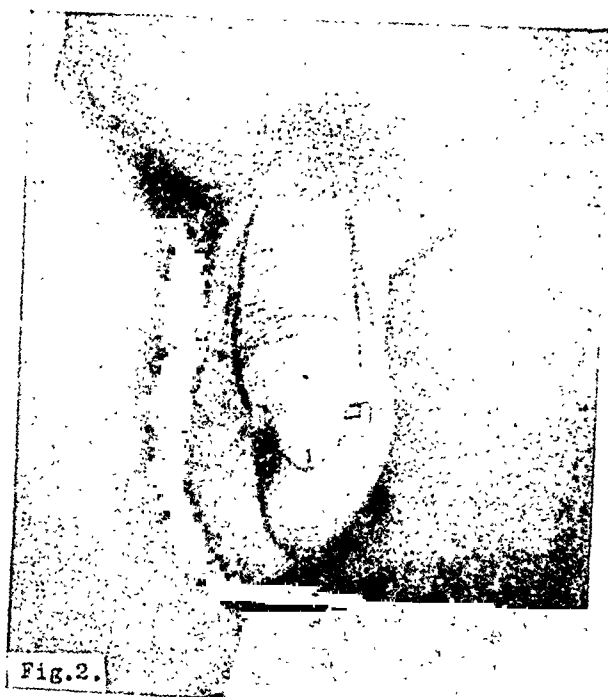


Fig. 2.

interesting to find this custom maintained by aboriginals in Borneo. The photograph (fig. 2) was very difficult to obtain as the Dyak objects very strongly to displaying the pallang, but eventually permission was obtained on condition that the wearer's face was not included on the plate. Pallangs are made of bone, ivory, metals, sometimes fishbone, and hard wood, and are frequently decorated with small feathers, gold or silver.

A Mirror of Hospital Practice.

A CASE OF SEVERE ANAPHYLACTIC REACTION FOLLOWING INJECTION OF AMINO-STIBUREA.

By N. CHATTERJEE, M.B.,
Domjore, Howrah District.

A LADY, aged 18, came to me for treatment of intermittent fever of some three months' duration. She had been treated by others with quinine with no effect; the spleen was enlarged to the level of the umbilicus, and the liver was also enlarged. Blood examination failed to shew malarial parasites; the differential leucocyte count was in favour of kala-azar, and the aldehyde test was positive. Clinically the case appeared to be a typical one of kala-azar.

She was given injections of Amino-Stiburea, commencing with 0.5 gm. After the third injection, the fever stopped.

The fourth injection was given at my dispensary. I took every possible aseptic precaution, but to my utter surprise and discomfort, the patient suddenly complained of a burning sensation throughout the body and of difficulty in breathing. A vivid urticarial rash appeared on the face, neck and chest, tears poured from her eyes, and the eyelids became acutely cedematous. Dyspnoea became so acute that acute laryngeal obstruction developed. I introduced my finger into the throat and found acute cedema of the epiglottis. The patient became cyanosed and death from asphyxia threatened.

Picking up a scalpel, which the urgency of the symptoms prevented my sterilising, I plunged it into the trachea at its most prominent point, and kept the edges of the aperture apart with a pair of dressing forceps; whilst I directed my compounder to give a hypodermic injection of $\frac{1}{2}$ c. c. of pituitrin solution. Five minutes later the dyspnoea had disappeared, and my regret at having inflicted a septic wound was very great.

I write to ask whether any of your readers has had any similar experience. What was the cause of the condition; is it preventable; was her recovery spontaneous or was it due to the injection of adrenalin and pituitrin?

(Note.—We have shewn the above account to Dr. L. E. Napier, who remarks that he has seen a similar severe case following the injection of Stibosan, and two others of less severity following on injections of urea-stibamine. The condition is clearly an anaphylactic one—the previous injections of antimony having made the patient unduly sensitive to the drug. An injection of adrenalin prior to giving the injection of Amino-Stiburea might have prevented the symptoms; whilst the injection of pituitrin clearly brought about relief. On the other hand the patient might have died but for the tracheotomy, and Dr. Chatterjee acted with commendable promptitude.—Editor, I.M.G.)

A CASE OF EMPYEMA OF THE ANTRUM OF HIGHMORE OF UNUSUAL INTEREST.

By J. F. LOBO, D.P.H., D.T.M. (L'pool),
Aldona, Goa.

A. R., a female of 18 years of age, came to my surgery complaining of paroxysmal headache during the past three years. The headache was violent and unbearable and would usually recur at intervals of about a week and would last for 8 to 21 days at a time. These attacks of headache were nearly always preceded by a bad smell from the right nostril. During the attacks there was an abundant discharge of watery mucus from the nose, particularly on bending the head forwards. The other symptoms complained of were more or less complete anosmia, intermittent nasal obstruction, weakness of eyesight and general prostration.

Examination.—On testing the eyesight I could find no error of refraction. By rhinoscopic examination, no pus could be detected in the middle meatus nor elsewhere in the nose, even under the posture test of Fränkel. In the mouth, however, there were stumps representing the upper second molar on the right side. As the symptoms appeared to point to a case of sinus infection I decided to make an exploratory puncture and lavage of the antrum, even though the examination of the nose did not show any evidence of pus at the time. The test of transillumination was not available here in rural practice. The right antrum having been punctured from the nose, the cavity was washed out with an alkaline lotion. The washing was not clear but showed some flocculent turbidity. There was no foul smell perceptible.

Operation and Treatment.—The diagnosis of empyema being thus confirmed, the antrum was opened from the buccal socket of the carious molar, which was extracted. Through the opening thus made, the antrum was treated with hydrogen peroxide and washed out with a pint of coll. alkaline at first twice daily and subsequently at longer intervals, the opening into the antrum being kept patent by means of an improvised plug or obturator made of a bamboo stick $1\frac{1}{2}$ inches long, thicker at the lower end, pared to fit the aperture and the whole encased in rubber—which was done by forcing it into a piece of soft catheter tubing. The washing of the antrum was continued regularly for six weeks. Though the headache never recurred during this period except once or twice, when it lasted for not more than an hour, the washing from the antrum was not yet free from turbidity.

In the meantime, the hole leading into the antrum was getting larger and larger so that it was found necessary to provide a new and larger plug about every ten days. On the 45th day of treatment the last plug accidentally slipped into the antrum in the evening and the

patient did not inform me of this until late the next morning. On examination, the hole into the antrum was very nearly blocked up by granulations and the missing plug could neither be seen nor felt by the probe. Efforts to dislodge it into a favourable position by the force of the stream of water during the irrigation were of no avail. I then opened the antrum by Telley's burr from under the inferior turbinate and tried to dislodge the plug from its position by washing the antrum forcibly from the two openings, alveolar and nasal, but unsuccessfully. At last I decided to fully explore the cavity of the antrum. The anterior third of the inferior turbinate which was enlarged was amputated and the antro-nasal opening previously made with the burr was freely enlarged by the use of punch-forceps. A little manipulation was sufficient to drag out the missing obturator with its rubber cover, after it had been lying there for six days. The alveolar opening being allowed to close, the antrum was washed out from the antro-nasal aperture every second day. In ten days' time the washing from the antrum became quite clear and free from all muco-purulent secretion.

The operation through the antro-nasal wall in this case, though it was incidental and designed for the removal of a foreign body from the antrum, must have contributed considerably to the cure of the malady by rapidly clearing the antrum of its muco-purulent contents. The patient was discharged completely cured on the 63rd day of treatment. It is now four months since the treatment and the patient is restored to perfect health and free from all former symptoms.

A CASE OF ANAPHYLACTIC ASTHMA SUCCESSFULLY TREATED BY PEPTONE INJECTIONS.

By SHIAM SINGH ATTRISH, L.M.P., L.M.D.,
R. A. F. Combined Hospital, Basra.

MIAN GUL, aged 25, a *chowkidar* in the I. W. T. Dockyard, was admitted to the R. A. F. Combined Hospital, Basra, for severe attacks of cough during the night; duration of symptoms about one year.

On examination the patient was found to be of fairly good constitution and physique. On inspection and percussion of the chest nothing abnormal was noticed; on auscultation a few rhonchi were heard scattered on both sides of the chest. The patient enjoyed almost complete freedom from attacks during the daytime, but got severe attacks of cough in the latter part of the night, immediately followed by a vague period of breathlessness, amounting to complete dyspnoea. The condition of the gums and throat was normal.

Treatment.—Nitroglycerine, potassium nitrate, tincture of strophanthus, and tincture of lobelia were tried in various mixtures, by the mouth. Liquor adrenalin, m. 5 to m. 10 in 4 c.c. of

saline, given hypodermically just before the spasm for several days running, was also tried. Intravenous iodine, 2 to 6 c.c. of aqueous solution on alternate days, was also tried. After 15 days of vigorous treatment by these methods, however, there was only the slightest relief of symptoms evident.

Finally, with the kind permission of Lieutenant J. P. Arland, L.M.S., my medical officer, Witte's peptone was tried; in 2 per cent. sterile solution with sufficient sodium carbonate to suspend and neutralise it in normal saline. The initial dose was 0.3 c.c. (5 minims), increased by 0.2 c.c. (3 m.) every fifth day hypodermically. All symptoms disappeared after the sixth injection. The dose then reached was repeated a further three times, and the patient was then discharged cured. Four months later he is now in good health and completely free from attacks.

Remarks.—1. The failure of adrenalin as a prophylactic; also of the other anti-spasmodics and of intravenous iodine.

2. 0.25 per cent. phenol was added to the peptone injection as a preservative.

3. Witte's peptone contains histamine and its albumoses are very toxic, so only a weak solution was employed.

4. Injections were not given during the attacks.

My thanks are due to Lieutenant J. P. Arland, L.M.S., for his kind permission to try the method of treatment.

AN INTERESTING CASE OF MALARIA.

By KARTICK CHANDRA BANNERJEE,
Kalagaiti Tea Estate Hospital, Leesh River Tea Co.,
Pillans Hat, Jalpaiguri.

ALL medical men in the tropics see cases of malaria in their daily round of practice. If the disease is properly diagnosed, its treatment is usually straightforward; if otherwise, in the majority of cases the results are bad. The following are particulars of an interesting case seen recently:—

A Pahari male, aged 34, Kancha by name, a *chowkidar* on this garden, was attacked with fever on the night of the 13th January and came to ask me for quinine tablets the next morning. Finding that his temperature was 99.2°F., with headache, constipation, a coated tongue, slight cough and aches all over the body, I gave him a dose of saline aperient and told him to report to me when it had acted. This he omitted to do; but on enquiry that evening I found that the bowels had been opened and that the fever had subsided.

On the following morning, instead of reporting at hospital as he had been told to do, he went to the Teesta river to worship it, as he was convinced that he was haunted by a ghost, responsible for the disease. On the morning of the 16th he had an attack of fever, with a typical rigor

and other symptoms. I gave him a dose of diaphoretic mixture, and at 1 p.m. went to his house to give an injection of quinine. The patient and his relatives, however, refused to permit this, as also to have him transferred to hospital; I did my best to overcome their objections, but was unsuccessful, and finally reported the matter to the manager of the garden.

At 3 p.m., having received a report that the patient's condition was bad, I went to see him and found him unconscious, with a temperature of 103.2°F., pulse 130 per minute, respiration irregular and deep, head retracted and eyes rolled upwards. The spleen was hard and enlarged, the liver not so. The pupils were normal and reacted to light, but the patient, who was a stout and well built man, was suffering from repeated tonic convulsions. I could find no wound or abrasion to account for tetanus; the knee jerks were present and Kernig's sign was partially positive.

The true diagnosis was in some doubt, owing to the aberrant character of the symptoms. A peripheral blood film, stained and examined, however, shewed 3 to 5 parasites of *Plasmodium vivax* in each field.

Treatment.—As the case was too urgent to send for the medical officer, I immediately gave an intravenous injection of 10 grs. of quinine bi-hydrochloride in 15 c.c. of saline, with the help of Babu G. C. Bose. Cold water was poured over the patient's head and a second similar intravenous injection was given four hours after the first one. Nothing was given by the mouth except hot milk when possible.

On the morning of the 17th almost all symptoms had disappeared, with the exception of fever—102.6°F., coated tongue and enlarged spleen. A blood film shewed 2 to 3 parasites still present per field. Two further similar intravenous injections were given. Calomel, gr. 3, and sod. bicarb. grs. 8 were also given and a diaphoretic mixture.

On the 18th, although a few parasites were still encountered in the blood films, a mixture containing quinine, arsenic and strychnine was given by the mouth. Also an occasional aperient saline. Finally, gr. 5 quinine bisulphate tablets were given daily for a course of 17 days. Parasites entirely disappeared from the blood films, and the patient is now—(April, 1926)—at work on the garden and free from all symptoms.

Remarks.—The symptoms and signs suggested the possibility of tetanus or of cerebro-spinal fever; diagnosis was only established by the microscope.

2. The rapid recovery from such severe symptoms upon treatment with intravenous quinine alone.

3. Prior to obtaining a microscope for this hospital I had to treat three similar cases, and was uniformly unsuccessful with them.

I am grateful to our garden manager, Mr. R.

H. Ferguson for the supply of this much-needed instrument in garden practice.

A CASE OF CEPHALO-TETANUS.

By K. S. RANGANATHAN, L.M.P.,

Medical Officer, Local Fund Dispensary, Thirupattur, Ramnad District.

THE patient, K. a Hindu male coolie aged 32 years, was admitted to the Government Headquarters Hospital, Ramnad, on 13-9-25, for difficulty in opening the mouth. Duration 3 days.

He stated that he was injured on the right side of the face and neck in a fireworks explosion ten days previous to admission. About a week later he felt some difficulty in opening the mouth, with inability to chew properly.

Condition on admission. The patient came to hospital on foot. The expression of his face was characteristic. The masseters and muscles of the neck were rigid and standing out prominently. The mouth could not be opened; the teeth could not be separated for more than a quarter of an inch. The muscles of the whole body were tonically contracted, but no clonic spasms were present.

A dirty looking ulcer covered by a scab was present on the right eyebrow. The other wounds had all healed.

The right (i.e., injured) side of the face was flaccid, immobile and expressionless with well marked paralysis of the facial muscles; the eye could not be shut, the lips could not be firmly closed. The paralytic condition of the facial muscles on the right side with the contracted state of those on the left, gave the face a curious asymmetry. The speech was not clear. Temperature normal.

Treatment and progress. The ulcer was cleaned, cauterized and dressed. He was put to bed in a dark room and a mixture of chloral hydrate and bromide of potassium prescribed; 3,000 units of tetanus antitoxin were given under the skin of the abdomen. Diet, small feeds of milk at frequent intervals.

14-9-25. Mixture and antitoxin repeated. Chloretone grs. 40 in 1 oz. of olive oil was given per rectum. Slept well.

15-9-25. Took mixture and diet well. Chloretone and antitoxin continued. A blister was applied on the right mastoid process. No fits. Slept well.

18-9-25. Looked drowsy. Refused diet. Condition of muscles just the same. Chloretone stopped. Mixture and antitoxin continued.

19-9-25. Still drowsy. Was fed with difficulty.

20-9-25. Better. Took mixture and diet.

22-9-25. Patient improving. Right upper eyelid could be winked a little. Muscles still stiff and contracted. One c.c. of a 1 per cent.

solution of carbolic acid was injected hypodermically. Chloretone grs. 20 in olive oil was given per rectum.

23-9-25 to 26-9-25. Same treatment. Sedative mixture, chloretone per rectum and carbolic acid injections.

27-9-25. Mouth could be opened a little.

30-9-25. Lockjaw much better. Patient was allowed a little bread. He could sit up. Carbolic acid injections discontinued.

2-10-25. Was put on half diet. Sedative mixture alone continued. Speech clear.

7-10-25. Muscles a little relaxed, particularly the abdominal ones. A blister was again applied over the right mastoid process. Patient was able to walk about with assistance.

13-10-25. Sedative mixture stopped. He was put on to potassium iodide mixture with liquor hydrargyri perchloridi.

18-10-25. Had to be discharged at his own request.

He was cured of tetanus, although he had not regained control over the facial muscles.

A chronic afebrile course, absence of clonic spasms and non-affection of the muscles of deglutition appear to be features of interest in the case. It will be interesting to know whether the facial paralysis is permanent or whether it is likely to be recovered from.

I have to thank Dr. G. O. Pothan, M.B., C.M., District Medical Officer, Ramnad, for permission to publish these notes.

A CASE OF ENDEMIC FUNICULITIS.

By JOHN PHILLIPS, M.B. (Lond.), F.R.C.S. (Eng.),
Nagarkata, Doars.

About the middle of January last, a coolie was reported to me as having "something wrong with his testicle." I found that a few days previously a painful swelling had appeared in the region of the left spermatic cord. At the time of my examination, the patient was obviously in considerable pain; his temperature was slightly raised and his pulse was 90. At the onset there had been vomiting and constipation now relieved by aperients, for the giving of which I was not responsible. In the substance of the spermatic cord was a definite, painful, tender swelling, at its maximum about an inch below the external inguinal ring. It did not seem to extend into the inguinal canal, neither did it reach the testicle although this organ was somewhat swollen. The overlying skin was red, but moved freely over the swelling. There was no impulse on coughing and there was no urethral discharge.

The appearances were such as to suggest at first sight a strangulated hernia or possibly, torsion of the cord. I must confess I was at sea, and well adrift, forsooth! However, negative facts are not without their value,

and, looking at the case as a whole, I realised that I was not dealing with a strangulated hernia, or any hernia for that matter, neither was there any torsion of the cord. In dealing with those and allied conditions, I was sailing more or less on a well-charted sea. Later, in a text-book of surgery, I came across a brief description of a condition referred to as endemic funiculitis, a disease of tropical and subtropical climates. It sounded right; I made it my diagnosis.

The case did not end in suppuration, there was no sloughing of the testis, and frequently applied fomentations resulted in gradual but definite resolution. The patient is now quite fit and presents a rather hard fibrous nodule in the course of the cord—the commemorative record of a painful past.

Will readers who have the advantage of more extensive knowledge please add to mine?

(Note.—The case was clearly one of acute funiculitis. The aetiology of this interesting condition, which is occasionally met with in Bengal, is obscure. It is not infrequently fatal. It is possibly due to lymphangitis due to filarial infection plus an acute local or embolic streptococcal super-infection. It would be of interest if any readers who may happen to see cases would investigate the aetiology of the condition.—Editor, *Indian Medical Gazette*.)

SOME CASES OF ASTHMA.

By G. RAGHUNATHA RAO, L.M.P.,
Premchand Boral Street, Bow Bazar, Calcutta.

AFTER reading the article entitled "A Note on Some Predisposing Factors in Asthma" appearing in the January 1926 issue of the *Indian Medical Gazette*, I am tempted to bring the following cases to notice:—

In the Ceded Districts of the Madras Presidency cotton-growing areas, a type of asthma which I call "cotton asthma" is very prevalent. I had a number of cases under my observation, of which I give the details of three typical cases; also details of another case which does not belong to the same type. In fact, in this case, as will be seen later, the exciting agent was newly harvested grain and not cotton.

Case 1. Peer Saheb, aged 50, Mahomedan male, a quilter by profession, in the employ of the M. & S. M. Railway. As his profession required handling cotton always, he had very frequent attacks of asthma and consequently he had to leave the service of the Railway Company. He came to me with dyspnoea. He told me that whenever he handled cotton, he was sure to have an attack. I wished to verify his statement and engaged him to stitch a quilt for me. For three days he was put on to Mist. asthmatica after a preliminary mercurial purge and on the fourth day, on my assurance that I would do my best to check the attack, he began to work with cotton.

Within 15 minutes of his handling the cotton, he got a typical paroxysm. I gave him 1 c.c. of adrenalin subcutaneously and waited for improvement. To my great surprise, he did not respond at all to the adrenalin. Half an hour later, another 1 c.c. was given, this time intramuscularly. This too had no effect. The attack gradually subsided. I did not know then why adrenalin had failed. But subsequently the article by Majors Acton and Chopra, in the *Indian Medical Gazette* for March 1925, gave me the correct explanation for the failure of adrenalin. As I had not known then the "occulo-cardiac reflex test" for determining the vagotonicity or otherwise, I did not carry out the test. Now it is obvious that he was "sympathetico-tonic."

Case 2. Subbarayadu, aged 18, Hindu male, an employee of a cotton merchant. He gets the paroxysm whenever he handles cotton, as in weighing and packing. His first attack manifested itself when he was about 16. No history of syphilis or any other venereal disease. He told me that he got the attacks very frequently during the harvest as he had to deal with the newly harvested cotton. The first time he came to me with a severe attack which subsided promptly after I gave him an injection of adrenalin 1 c.c. subcutaneously. But the next day he got another attack and this time adrenalin failed to give him any relief. Subsequently on three or four occasions adrenalin failed to relieve him. He was advised to abstain from handling cotton. He had to leave his job.

Case 3. Zyno Bee, female child, aged 7, Mahomedan. Every winter she used to get frequent attacks of asthma, subsiding without any treatment. Once at 2 A.M. I was taken to visit the child when she was having a typical paroxysm. I gave her 0.5 c.c. of adrenalin subcutaneously, which immediately relieved her. For a week afterwards she was given the usual asthmatic mixture. But she had several attacks in spite of the mixture and adrenalin. As this was puzzling I asked the father to leave the child in the care of her uncle who was living next door to my dispensary. After coming to this house, she began to improve and when I carefully enquired into the actual materials with which the child came into contact, I was told that she was given a simple diet and she slept on a mat and not upon a cotton-stuffed quilt as she used to do in her father's house. This gave me the clue and to verify it, I asked the uncle of the child to give her a cotton quilt to lie upon and that night she had an attack. This settled the matter. Poor people during the summer generally sleep on mats, and only during the winter do they use quilts. This probably explains the occurrence of the attacks in winter. The parents were advised not to allow the child to sleep on cotton-stuffed

quilts. The point of interest in this case is the age of the patient, 7 years.

The following case also, is interesting, though cotton was not the exciting factor.

Case 4. Pullamma, Hindu female child, aged 6 years, daughter of a grain merchant. She used to get the attacks during the harvest season. The harvested maize and corn used to be stored in the house. Whenever she played in the heaps of grain she used to suffer from attacks of dyspnoea. The first time I saw her while she had a paroxysm, adrenalin gave her relief and later she was put on to Mist. asthmatica. But in spite of this, she was sure to have an attack whenever she played in the grain heap. I advised the merchant to store the grain beyond reach of the child; and the child herself was terribly afraid of the grain heaps.

Points of interest in this case are the age of the patient and newly harvested grain being the exciting agent.

Some cases of asthma fail to respond to adrenalin from the very beginning, whilst others respond at first, but later on do not. The nature of the exciting agents is very variable.

In some of my cases there was intolerance to a particular kind of food, for example one of my patients showed intolerance to butter-milk and curd. Adrenalin never relieved him.

Possibly desensitisation with extracts of the offending protein will cure the cases. But this has not yet become a practical application in general practice. As some of my patients had to abandon their jobs and suffer from misery, the problem is becoming a serious and an urgent one. I would like to know if reliable extracts of the different proteins are available or if there is any firm which undertakes to supply extracts from the material supplied by patients' medical attendants.

A NOTE ON THE TREATMENT OF TETANUS.

By B. I. KEWALRAM, L.C.P. & S.,

Daharki, Sind.

ON p. 170 of the *Indian Medical Gazette* for April 1925, I came across an interesting article on the treatment of tetanus by hypodermic injections of carbolic acid and of a magnesium sulphate solution. The details with regard to the following patient shew the comparatively inferior value of this line of treatment when compared with treatment by injections of anti-tetanic serum:—

I was called in on the 15th December 1925, to see a Hindu lady, aged 35 years, who had been delivered of a child a fortnight previously, and who was suffering from tetanus, as the result of the filthy ministrations of a local *dhai*.

Lock-jaw was almost complete, and only the tip of a little finger could be admitted into the mouth; the temperature was 101°F., with occasional convulsions of the back, and a history of having had no sleep for the previous two nights. She could swallow fluid well however. There was no abnormal discharge from the vagina. The patient stated that her brother had died of tetanus some years previously.

For the first three days I gave daily 1500 units of B. W. & Co.'s anti-tetanic serum, together with a routine sedative mixture by the mouth. I then began a course of daily hypodermic injections, in the morning of 25 minims of a 25 per cent. solution of magnesium sulphate, in the evening of 15 minims of a 1 per cent. solution of carbolic acid, and continued these for a week. The immediate improvement after the injections of anti-tetanic serum was followed by very slow improvement on the magnesium sulphate and carbolic acid treatment, however. At the end of the latter, she could swallow solid food, but there was still rigidity of the joints.

On the 25th December, I again gave an injection of anti-tetanic serum, and for the next week gave the patient only a mixture by the mouth, and waited to see the results. The condition then cleared up completely.

The injection treatment with magnesium sulphate and carbolic acid may be helpful at times, but it can in no way compare with the treatment by the specific anti-serum. An interesting point about the case is the history that her brother died of tetanus.

A CASE OF FEVER DUE TO THE *BACILLUS FÆCALIS ALKALIGENES*.

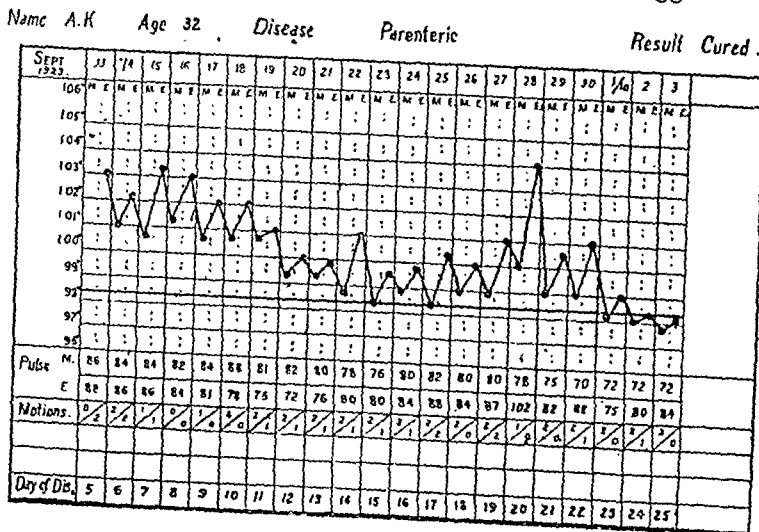
By Y. S. ROW, I.M.P.,
Alipuram Jail Hospital, Bellary.

Cases of infection with the *Bacillus fæcalis alkaligenes* are rare in ordinary practice. This

inhabitant" of the intestinal tract, symptoms attributed to it are very rarely diagnosed except by cultural examination of the stools. This bacillus has been isolated from the blood in certain cases of suspected typhoid fever. It is also stated to be responsible for some cases of "fever with sudden onset, with slight chill and severe headache, nausea and occasionally vomiting, with aching of the limbs. The fever may last for two to five days, ranging up to 102°F., often with a second pyrexial period". The fever due to this bacillus is termed "parenteric" by Castellani and Chalmers.

The following are notes of such a case which came under my treatment:—The patient, A. K., aged 32, and a good physique, came under treatment on the 13th September, 1923, with a history of fever for the previous four days. He had kept no record of the temperature, but said that he had fever in the evenings, and that it left him in the mornings. There was no headache but he complained of severe pains all over the body. The temperature chart subsequent to admission was as shown, coming down to nearly normal on the 15th day of disease, and thereafter rising again until it reached 104°F. on the 20th day, and reaching normal on the 23rd day of disease. During the course of illness he had mild diarrhoea with pea-soup-like stools.

His general condition was that of a typhoid patient, with a pulse which was slow in comparison with the temperature chart. Repeated examinations of the blood for malarial parasites gave negative results. The differential leucocyte count was as follows:—polymorphonuclears 66 per cent., lymphocytes 24 per cent., large mononuclears 10 per cent. The serum gave a very partial agglutination to *B. typhosus* at 1 in 10, but not in higher dilutions, and was negative to *B. paratyphosus* A, B and C. *Bacillus fæcalis alkaligenes* was isolated from the stool on plating, but no other pathogenic organism. The agglutination reactions and



bacillus belongs to the typhoid-coli group of bacteria, and though it is said to be a "frequent

cultural tests were carried out at the King Institute of Preventive Medicine, Guindy.

The treatment adopted was the same as that for a case of enteric fever, with careful attention to the diet. The patient made an uneventful recovery.

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AN INTERESTING CASE OF ECTOPIA VESICÆ.

By M. D. DAVID, M.B., C.M., F.R.C.S.E.,
Civil Surgeon, Shwabo, Upper Burma.

THE photograph shows a Bengali male child, aged about 18 months, with an exposed angry-looking mucous area about $1\frac{1}{2}$ inch in diameter over the lower part of the abdomen, from which urine has been oozing out continuously since



birth. The symphysis pubis and the urethra are missing and there is inguinal hernia on both sides. The penis is rudimentary. The inflamed mucous area represents the posterior wall of the bladder, which has no anterior wall and symphysis pubis in front of it. This prominent swelling is affected by respiration and is made smaller by gentle pressure. The skin round this area is excoriated by the constant flow of urine and there are tiny hæmorrhagic patches on the inflamed mucous membrane. The openings of the two ureters can easily be made out in the area. The child is hale and hearty, except for the constant dribbling of urine, which necessitates change of clothing every now and then, and for the excoriation of the skin all round, which causes a lot of discomfort and itching.

The reconstruction of the anterior bladder wall with the available skin all round is out of the question, as calculi are likely to be formed and as such a procedure will not improve the

situation, for constant dribbling will still go on, due to the absence of the sphincter. In such a case, the formation of a new urethra is another difficult problem. Cystitis and ascending infection have to be feared as well. It is reported that these children have grown up to adult life, enjoying good health except for the nuisance caused by constant dribbling of urine. I propose to deal with the case by the provision of a rubber bag, to be worn constantly by the child, till it grows to the age of 5 or 6, when the question of operative treatment should be reconsidered. Possible procedures will then be:—

1. Transplantation of the ureters one by one at the interval of a month to any portion of intestine which has been isolated, or to the pelvic colon or rectum by carrying 1 inch to $1\frac{1}{2}$ inches of the lower end of each ureter intramurally along the intestinal wall or allowing the same bit to be tucked in with it.

In such a case, urine will be passed by the rectum every few hours apart from the motions with voluntary control, but such an operation does not exclude the risk of ascending infection of the kidneys.

2. Transplantation of the ureters to the skin of the lumbar region, which will still necessitate the constant wearing of a rubber bag to collect the urine dribbling away continuously. After the transplantation is done, the mucous membrane will harden more or less into skin and may not require excision, there being no more dribbling from it.

A CASE OF PREGNANCY COMPLICATED BY FIBROMA OF THE CERVIX UTERI.

By G. SRINIVASA AIYER, L.M.P.,
Chittoor.

ON the night of the 28th December, 1925, I was called in to see a case of hæmorrhage in a woman in advanced pregnancy. She had been having bearing down pains for two days prior to my seeing her, with severe bleeding. For the previous six months, she said, she could not pass urine freely without introducing a finger into the vagina and pressing on its posterior wall. (This statement, however, she only volunteered after operation, and when the tumour was shewn to her.)

On examination I found the cervix dilated to three finger-breadths, with blood oozing out. On further examination a hard mass was found attached to the cervix, with the fœtus freely moving in the uterus above. Next morning under chloroform I removed the tumour; it proved to be a fibroma of the cervix, about the size of a shelled coconut, with a number of blood vessels on its surface, bleeding having been due to a rupture of some of these.

The wound healed by first intention, and the patient is at present doing well.

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UREA-STIBAMINE.

A REPORT which appeared in the *Statesman* of March 23rd, 1926, is one which will be of considerable interest to many of our readers. It deals with a judgment which was delivered in the High Court of Calcutta by Mr. Justice C. C. Ghose in the case of Rai Bahadur Dr. Upendra Nath Brahmachari, M.D., D.Ph. (Calcutta), F.A.S.B., and others *versus* the Union Drug Co., Ltd., of Calcutta.

Dr. Brahmachari applied for an injunction against the Union Drug Co., of Calcutta, a firm of chemists, to restrain them from using the name "Urea-Stibamine" and from selling an antimony compound manufactured by them under that name. The learned judge directed that the Union Drug Co. be restrained from doing so until the final determination of the further suit for damages. He directed that they should be restrained from using the name "Urea-Stibamine" and from selling packages of this drug in its present get-up or in any colourable imitation of the packets of the drug as sold by the plaintiff and others, through a Calcutta firm of chemists.

As the further case is still *sub judice*, and cannot be settled for some months, it would be improper to make any comment upon it; and we therefore publish below an extract from the report by the *Statesman*, with due acknowledgments to our contemporary. This will enable our readers to form an opinion as to the issues involved. They are not inconsiderable, as "Urea-Stibamine" has now a well-established reputation in the treatment of kala-azar, and the question of its supply and cost affects the Public Health Departments of four provinces in India.

Apparently there were two issues in the case; the first was as to the use of the name "Urea-Stibamine"; the second the allegation that the Union Drug Co. was issuing the drug packed in such a manner as to suggest that it had been manufactured and put up by Dr. Brahmachari. The second issue, of course, does not interest the medical profession in India as much as does the first.

In the course of a long judgment, Mr. Justice Ghose dealt with the history of "Urea-Stibamine," making free use of a report by Dr. Napier from our issue for December 1923, p. 578. The trial of the final case will not take place for some months, but it is likely that many points of interest to the medical profession, not only in India, but in other countries where kala-azar or oriental sore are prevalent, will be raised.

In the meantime, the position under the present ruling is that Dr. Brahmachari alone is entitled to use the name "Urea-Stibamine" for the purpose of manufacturing and selling the pentavalent derivative of antimony which he discovered and described in the *Indian Journal of Medical Research*, October 1922, p. 508. His enquiry was financed by the Indian Research Fund Association, and most of us were under the impression that Dr. Brahmachari had given both the name and the process of manufacture to the world. In this we misunderstood Dr. Brahmachari. He claims, and his contention has now been upheld by the High Court of Calcutta, that he gave the process of manufacture to the world, but reserved the name "Urea-Stibamine" as a fancy or trade designation, for his own private use in the manufacture and sale of the drug.

We understand that the Union Drug Co. is now selling the compound which they formerly termed "Urea-Stibamine" in different packages, under the trade name "Stiburea."

J. W. D. M.

The following is an abstract from Mr. Justice Ghose's judgment, taken from the *Statesman* of March 23rd, 1926:—

The plaintiff Dr. Upendranath Brahmachari, who is a well-known and distinguished medical practitioner in Calcutta, has since 1913 been engaged in researches for discovering a cure for kala-azar. The introduction of a successful treatment for kala-azar is a matter of the first importance to the provinces of Assam and Bengal where kala-azar is largely prevalent, and it is said that Dr. Brahmachari discovered in 1921 an antimony compound for the treatment of kala-azar. It appears that the firm of Von Heyden of Dresden had previously prepared and placed on the market an aromatic compound of antimony, namely sodium para-acetyl-amino-phenyl stibiate. This compound had first been used in Italy by Caronia (1916) and later by Spagnolio (1920). Their results had been promising but by no means absolutely convincing. It was tried in England by Manson-Bahr who used it in one case of kala-azar and reported favourably on it. In the same year Mackie (1921) obtained supplies of this compound from Messrs. Allen and Hanbury's Ltd. through whom it had been placed on the market under the trade name of "Stibenyl." The results however were not encouraging; it was about this time (1921) that Dr. Brahmachari, who as stated above had been working for some time past on the antimony compounds, produced and tested a number of aromatic compounds of antimony, and with some of them he obtained good results; he reported that with the compound which he had named "Urea-Stibamine" his results were exceptionally good. He treated a number of cases with this substance in 1921 and reported the results of the treatment of eight cases in the *Indian Journal of Medical Research*, edited among others by the Director-General, Indian Medical Service, for October 1922. About the beginning of the year 1923 Dr. Brahmachari arranged to produce "Urea-Stibamine" on a large scale and was able to supply it to other workers for trial. Major Shortt, who is a member of the Kala-azar Commission, tried it in a number of cases in Shillong and reported very favourably. Other workers gave to this new cure "Urea-Stibamine" an extensive trial and reported favourably. It was now (1923-24) quite clear that a number of cases of kala-azar that had been treated with "Urea-Stibamine" were recovering much more rapidly and with less treatment

than would have been necessary had they been treated with antimony tartrates. Dr. Brahmachari states that he invented and coined the name of "Urea-Stibamine" for the purposes of his business of manufacture and sale of the said antimony compound and had all along used the name. He states further that the antimony compound manufactured and sold by him is well known to the public generally by the name of "Urea-Stibamine" and is indeed asked for by the public under that name. He states also that the said name of "Urea-Stibamine" used in connexion with the said antimony compound for the treatment of kala-azar is always understood by the public generally to mean and refer to the antimony compound manufactured and sold by him. Since 1923 Messrs. Bathgate and Co. have been and are acting as sole distributors in the market of Dr. Brahmachari's antimony compound for the treatment of kala-azar.

It appears that Dr. Brahmachari submitted in 1920 an application to the Indian Research Fund Association for a grant-in-aid to enable him to continue his research work and that as a result of his application he received a certain amount of financial assistance from the said Association on the understanding that he would publish the results of his researches in the *Indian Journal of Medical Research*. This is clear from Dr. Brahmachari's affidavit of March 8, 1926, and from a copy of a letter dated February 27, 1926, from the Secretary of the Governing Body of the Indian Research Fund Association to the address of the defendant company set out in the affidavit of Hari Pada Bhattacharji of March 2, 1926. As indicated above, Dr. Brahmachari published the results of his researches in the said journal in October 1922. Further papers embodying the results of his later researches were also published by him in October 1924 and July 1925 in the said journal. Dr. Brahmachari's formula for "Urea-Stibamine" is set out on page 508 of the *Indian Journal of Medical Research* for October 1922. He states that the starting material in the preparation of the antimony compound known as "Urea-Stibamine" is acetyl-p-amino-phenyl-stibinic acid. The sodium salt of this compound is sometimes known as stibacetin.

Dr. Brahmachari claims that "Urea-Stibamine" is an altogether fancy word like "Arsamin" or "Soamine." The word "Urea" is of course a well-known chemical term. Dr. Brahmachari's point is that although he has given the formula to the world for the preparation of this particular antimony compound which is claimed by him as a cure for kala-azar, he has given to this antimony compound a name which is not descriptive of the compound but which is a fancy word made up of two words urea and stibamine, the word stibamine signifying by itself something which does not enter into the composition of the antimony compound known as "Urea-Stibamine."

It appears that on the 23rd December, 1925, the defendant company wrote a letter to the Director of the Calcutta School of Tropical Medicine and Hygiene in which they enquired whether they could use the name "Urea-Stibamine" in respect of an article manufactured according to the formula of Dr. Brahmachari. Dr. Brahmachari states that the letter in question was forwarded to him by the Secretary, Indian Research Fund Association, for an expression of his opinion and that he immediately objected to the defendant company using the name "Urea-Stibamine." On January 20, 1926, the defendant company inserted an advertisement in the *Statesman* newspaper in which they stated that they had been authorised to manufacture "Urea-Stibamine" for District Boards, hospitals and other public health centres, and that in manufacturing "Urea-Stibamine" they followed the process of Dr. Brahmachari as published in the *Indian Journal of Medical Research*. It is not clear from the advertisement as to who had authorised the defendant company to manufacture "Urea-Stibamine"; Dr. Brahmachari states that he had never authorised the defendant company to manufacture the antimony compound referred to above under the name of "Urea-Stibamine." In February 1926 the defendant

company put their manufactured article on the market under the name of "Urea-Stibamine" and on February 23 the plaint herein was filed and the present rule obtained from this court.

As stated above, Dr. Brahmachari's contention is that since the beginning of 1923 he has manufactured "Urea-Stibamine" and sold the same through Messrs. Bathgate and Co. on a large scale under a particular get-up which is described in para. 7 of his petition. He claims that his get-up is quite distinctive and well known to the public in connection with the antimony compound manufactured by him and claimed as a cure for kala-azar. He urges that the defendant company have no right whatsoever to manufacture and offer for sale an antimony compound under the name of "Urea-Stibamine."

In opposition to the rule Hari Pada Bhattacharji states that as a result of the research work of a number of gentlemen in collaboration with Dr. Brahmachari an antimony compound was prepared which was given the name of "Urea-Stibamine" and that the scientific description of this compound is a urea derivative of para-amino-phenyl-stibinic acid. He states further as follows: "I deny that the plaintiff Upendranath Brahmachari invented the name for the purpose of his business and I say that the name was intended to designate a compound which it was intended to use for the treatment of kala-azar. I deny that the name of 'Urea-Stibamine' is understood by the public generally or at all to mean or refer to the antimony compound manufactured and sold by the plaintiff Upendranath Brahmachari or by any one particular person. I say that it is understood to denote the antimony compound itself." Hari Pada Bhattacharji is supported by a large number of medical practitioners who state, among other things, that the carton used by the defendant company is the usual and standard packing for single ampoules. The affidavits are more or less on the same lines.

It is argued that a man in the position of Dr. Brahmachari, who has published to the whole world his formula for making the antimony compound known as "Urea-Stibamine," cannot be in a better position than the man whose patent has expired or whose secret recipe becomes known.

On behalf of Dr. Brahmachari Sir Binod Mitter and Mr. Sircar have contended that the name in question, namely, "Urea-Stibamine," is not descriptive of the article at all and has indeed no chemical meaning and will not convey any meaning whatsoever to any student of organic chemistry. They argued that by the word "Urea-Stibamine" the presence of phenyl and the absence of sodium are not indicated in the compound and they contended on the affidavit used before me, and indeed on the evidence of Hari Pada Bhattacharji, that the scientific name of the antimony compound prepared by Dr. Brahmachari for the treatment of kala-azar is carbamide or urea-para-amino-phenyl-stibinate, and that the name "Urea-Stibamine" was in the circumstances set out above having regard to the chemical composition of this particular compound a purely fancy or invented word like many other words such as Stibenyl, Stibosan, Aminostiburea and Stibamine Glucoside. Sir Binod Mitter's contention was this:—That if an article can be denoted by a proper descriptive name, but the person inventing or discovering it chooses to describe the article by a fancy name and manufactures and sells the same under that fancy name, no one is allowed to appropriate that name and manufacture and sell the article in question under that fancy name. In other words, Sir Binod's contention was that whereas here you have a proper scientific compound which has been found by Dr. Brahmachari to be efficacious in kala-azar cases, but which compound Dr. Brahmachari has not chosen to call by and under its proper scientific and descriptive name, but has chosen to call it by the name of "Urea-Stibamine" which to the student of chemistry does not connote by itself any chemical substance discovered up to date in the region of bio-chemistry and which name by itself does not enable any student of chemistry to find out the chemical formula set out on page 508 of the *Indian Journal of Medical Research*

for October 1922, he is entitled to the relief he seeks. On the merits it was strongly urged on behalf of the plaintiffs that there was bad faith on the part of the defendant company and that they having thought that the word "Urea-Stibamine" was attractive, they proceeded to see, to use a familiar expression, money in the word and to appropriate the word. It was made clear before me that Dr. Brahmachari has no objection whatsoever to anybody preparing an antimony compound for treatment in kala-azar cases according to his formula; but it was argued that inasmuch as Dr. Brahmachari has built up a large business due to the fact that the word "Urea-Stibamine" has by now penetrated into the the particular antimony compound r. Brahmachari and claimed by him as a cure for kala-azar, it was only right and proper that the defendant company should be restrained from committing an act of piracy so far as the name "Urea-Stibamine" is concerned and from selling their antimony compound under a get-up strikingly similar to that of the plaintiffs.

I think what I have set out above represents with accuracy the respective contentions of the parties, and it is now my duty to decide whether or not the present rule should be made absolute. I am not at the present moment trying the case; all that I have got to see is whether a *prima facie* case for a temporary injunction has been made out by the plaintiffs and whether the balance of convenience requires that I should grant a temporary injunction against the defendant company till the final determination of this suit. In my view, on the evidence before me I am satisfied that the word "Urea-Stibamine" is not a descriptive word at all and that it has no chemical meaning whatsoever and that a *prima facie* case has been made out for my interference.

In this case I have very carefully and anxiously considered the question of the balance of convenience, and I have come to the conclusion that in the circumstances stated above and on the evidence adduced before me it is my clear and obvious duty to make the rule absolute. I accordingly make the rule absolute and direct that the defendant company, their servants and agents, be restrained until the final determination of this suit and until the further orders of this court from using or applying or causing to be used or applied to the antimony compound mentioned in the plaint herein and sold by the defendant company the name "Urea-Stibamine" with the present get-up or any colourable imitation thereof, and I further direct that the defendant company, their servants and agents, be further restrained until as aforesaid from using or employing the said word "Urea-Stibamine" or any other words in a manner contrived or calculated to represent or induce the belief on the part of purchasers that the said antimony compound sold by the defendant company, their servants and agents is the antimony compound manufactured and sold by or on behalf of the plaintiffs.

SPECIAL ARTICLE.

ACUTE DIARRHŒA AND VOMITING IN CHILDREN. COMPLICATIONS AND TREATMENT.

A Post-Graduate Lecture.

By V. B. GREEN-ARMYTAGE, M.D., M.R.C.P. (Lond.),
MAJOR, I.M.S.,

*Second Professor of Obstetrics and Gynecology,
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THE hot weather is upon us, and acute summer diarrhœa, cholera infantum, or acute gastro-enteritis, or acute bacillary dysentery, are all terms denoting one of the greatest tragedies of

life in the East. It may, therefore, help you practitioners if I may be permitted to put before you some personal experiences of treatment and prognosis.

In the early days of the hot weather many of these cases are due to the fact that mothers and doctors do not realise that when the temperature in the plains rises a child does not want so many calories of food as it does in the cold weather; therefore, if this be forgotten, it may be that the child's digestion becomes very severely taxed and diarrhœa and vomiting occur. The first attack may be so severe as to kill the child, but more often Nature's warning of some error in the diet is kinder, and the first or second attacks are of mild degree. Should the mother then not take heed, a greater tragedy may occur. My own experience in Bengal points to the fact that the worst cases occur in June, July, August, and September, when the climate is moist and very hot.

First of all, let me impress upon you the fact that these cases are always of bacillary origin whether Shiga's, Flexner's, or Gäertner's bacillus matters not one iota in the treatment, for the condition is so fulminant in the majority of cases that no form of auto-vaccine treatment is of avail in time. The next point I want to emphasise is that *Entamoeba histolytica* is practically never the cause.

Working in conjunction with Sir Leonard Rogers before the war, the stools of 100 consecutive cases of fulminant acute gastro-enteritis were sent to his laboratory by me. In only 2 per cent. were amœbæ discovered; and since the war in not one single case seen in consultation have amœbæ or Charcot-Leyden crystals been demonstrated in any case of acute diarrhœa where mucus and blood have been present in the stools. I wish to lay particular stress on the above facts, because experience as a consultant has shown me that the drug most beloved of the practitioner in cases of diarrhœa with blood and mucus is emetine. This drug is not only useless but is dangerous, for, apart from the fact that it bolsters up false hope in mother and doctor, it prejudices the life of the child by loss of valuable time and by causing great cardiac depression.

It is not necessary for me to draw a clinical picture of these cases, except in so far as to remind you that the high temperature is evidence of bacterial invasion, and that, as in similar invasions, if the infection be very virulent a sub-normal temperature suddenly shooting to 106°F. with a convulsion is not at all uncommon. Moreover, I should like to remind you that diarrhœa and vomiting, associated with its consequent starvation, is an absolute cause of acidosis, and that this acidosis is frequently the forerunner of death. Therefore, I would particularly ask you to observe the deep gasping air hunger associated with the white-grey sunken face and cherry-red lips of these children, which, as you know, are obvious signs of acetonemia.

Another point which I should like you to observe is the condition of the buttocks; for, if the infection be one by the putrefactive group of organisms, the buttocks are usually not sore or red, the stools are alkaline and of extreme offensiveness in the early stages. This will give you an indication as to the fluid diet that you should give, e.g., barley gruel, or rice water, since putrefactive organisms do not thrive on a carbohydrate pabulum. If the buttocks are scalded and red, and the stools sour and acid, this is evidence that gas-forming bacilli are in the ascendant; and these organisms do not thrive on a protein pabulum such as albumen water.

In the cases which I am describing the infection is so severe that, whatever the cause, you must have at your fingers' ends the details of treatment; and these details you must put in writing and see that they are carried out to the letter if you would preserve the life of the child.

The essential principles of treatment are:—

1. To get rid of the poison (bacteria or toxin), and to allow the inflamed intestine an opportunity of recovering.

2. To counteract the acidosis.

3. To supply the loss of fluid from bowel and stomach, for it is this dehydration factor which so often kills the child after the intoxication factor has been dealt with.

4. To give that fluid diet which will least provide a pabulum for the organisms which have caused the disease.

As regards No. 1, put the child at once on half or one-hourly doses of sodium sulphate grs. 20; sodium bicarbonate grs. 10; sodium citrate grs. 10; glycerine 20 minims; aqua anisi 1 drachm; until the stools become watery and brown. If there is vomiting wash out the stomach with 1 per cent. sodium bicarbonate solution, using a catheter and funnel; the same solution can be used to wash out the rectum. If the vomiting is severe, give 1½/10 or 1½/6 gr. of calomel (B. & W. Tabloid) every hour for 6 or 8 doses;—sometimes 1 minim doses of chlorodyne are more useful.

As regards No. 2 (which it is so essential to remember), add half a teaspoonful of bicarbonate of soda and half a teaspoonful of salt to a pint of boiled water, with ½ a grain of saccharine to make it palatable, and give the child as much as it can possibly drink of this solution for it acts in two ways, not only does it supply the loss of body fluid but the salt makes the child thirsty and therefore automatically it is inclined to drink more and more of the solution. There is just one point about this treatment which you must remember, and that is that sometimes acute oedema may occur as a result of the sodium chloride; if so, this commodity can be cut out.

In addition to the medicine quoted under heading No. 1, another useful means and home remedy for combating the acidosis is the glucose-containing raisin tea. This is made by adding one tablespoonful of white raisins (*kismis*) to one pint of boiling water, crushing

and straining. Infants and children take this readily, one ounce or more every hour.

As regards No. 3, the shrunk muscles, loose skin, and sunken eyes cry out to you that the tissues have been drained of fluid, and if you do not counteract this loss the infant will die of dehydration. The methods of supplying this loss of fluid can be by the mouth, under the skin, or into the peritoneal cavity. Saline given per rectum is useless in these cases for it is constantly evacuated and the child lies in a green slimy swamp.

In less severe cases, or better still, early cases, giving the salt and bicarbonate solution mentioned under heading No. 2 is the ideal method, and I can assure you it is no uncommon thing to find that an infant will take 2 pints of this solution in 24 hours; and I advise the parent to put it in a bottle with an easy teat and give it almost continuously. However, in late cases urgent measures are necessary, and I would advise you not to hesitate but inject 4 to 6 ounces of saline (made up from B. & W.'s Soloids), under the skin of the axilla every 5 hours, and if the case is an extreme one, not to hesitate to give the saline intraperitoneally. This is a perfectly easy and safe procedure; all that is necessary is to attach a large "Record" syringe needle to a rubber funnel previously boiled, then, choosing a point in the middle line, just below the umbilicus, pick up the abdominal wall between your finger and thumb and drive in the needle at right-angles 1½ inches, then release your hold upon the abdomen. Ten to 20 ounces of saline can rapidly be run in and there is only an infinitesimal risk of injuring the bowel. Scores of infant lives have been saved by this means, as have the lives of adults in cholera.

As regards No. 4, feeding: to begin with nothing is given except rice-water, which is the least irritating of all the cereal waters. This is made by adding one tablespoonful of rice to 1½ pints of water, boiling, straining, and adding a pinch of salt and one teaspoonful of brandy. Children like this, and in the great majority of cases it is far better to start with this than with albumen water, for 90 per cent. of these cases are infections with putrefactive organisms. The Germans do not use rice-water or albumen water, but pin their faith on weak tea made by adding one teaspoonful of tea leaves to a pint of boiling water, standing three minutes and decanting, adding ½ a grain of saccharine to make it palatable. This solution is given with or without a minute portion of milk. It is thought to be diuretic and stimulant, and certainly in my own hands has proved very useful.

After 48 hours some additional food must be given, though it should be remembered there is some food value in rice-water and in the raisin tea mentioned under heading 2. German authorities are great believers in protein milk, but this is difficult to prepare. For myself I prefer to rely on whey, or skimmed milk, given alternately

to start with, with rice-water. The easiest way to make skimmed milk—which I may here remind you is of extreme use in cases of indigestion in infants, and especially in that disease almost peculiar to India, infantile enlargement of the liver with wasting and cedema,—is to take a small enamel douche can, insert a cork in the tube outlet, and simmer therein fresh milk for half an hour, then remove and place on ice for 2 hours. The fat of the milk will by then have all risen to the top, and the lower two-thirds in the vessel can then be obtained by removing the cork from the outlet and letting the milk run into a clean jug. This milk is to all intents fat-free, and should be given diluted 1 in 3 to start with, gradually increasing its strength.

Here let me warn you that under no condition whatever, and despite all protestations of the mother, must you give any form of sugar or any fat-containing food in the early stages of your treatment. As the child improves, the strength of its feeds can gradually be increased. Mellin's food or Dextrimaltose (Mead's) is the easiest way of beginning to add sugar.

Perhaps here I may remind you that, where the organisms have been definitely reported upon as belonging to the putrefactive group, the Finkelstein method of giving, as the only food, one teaspoonful of sugar of milk to a pint of water, is an eminently satisfactory and successful one in the early stages.

Drugs, beyond those I have mentioned under heading 1, have no place in the treatment of this condition, and most particularly I want to warn you against the use of astringents, either in the form of acids, bismuth or opium. All that these things do is to cause distention and fever, due to the accumulation or non-evacuation of intestinal intoxication products. You will see, therefore, that the treatment of acute diarrhoea in infants is exactly on the same lines as the treatment of acute bacillary dysentery in adults.

There are certain *complications and symptoms* which may demand additional urgent treatment. For instance:—

1. Vomiting. This is best dealt with by washing out the stomach with one teaspoonful of bicarbonate of soda to the pint, using a No. 10 or 12 soft Jacquet's catheter. Remember that vomiting is an expression of the gravity of the case, and should give you warning to be ready to give saline into the peritoneal cavity if need be.

2. Hyperpyrexia is a grave symptom and frequently ushers in convulsions. Cold packs or a cold bath, or ice-cold enemata may have to be given and repeated. I have sometimes thought that one-grain doses each of Dover's powder and aspirin saved some of these cases.

3. Collapse or cold clamminess are frequently the precursors of death. A hot mustard bath, brandy by the mouth with an injection of camphor in oil are useful, but usually the

condition indicates the immediate necessity for intraperitoneal saline with or without minims 5 of adrenalin to each pint.

4. Rectal tenesmus is often the cause of shock and continual whining. I would advise you to apply round the anus a mixture of equal parts of zinc oxide and castor oil, and then place hot bread or linseed poultices over the anus. I do not think that in the really bad cases washing out the rectum with saline is any good, but it is useful in those cases where there are four or five motions only per day with great straining and blistering of the perineum. If there is a great deal of mucus in the stools, I have often thought that this mucus has some mechanical protective capacity and therefore it is a mistake to order saline bowel washes. However, if bowel washes are given, remember that it is not necessary or wise to pass the catheter more than 4 inches, for if the buttocks be raised on a pillow the saline will with ease reach the transverse colon before peristalsis ejects the debris.

5. Convulsions frequently initiate and sometimes terminate acute diarrhoea. In the early stages a warm bath and a preliminary dose of castor oil are useful, but convulsions in the late stages rarely react to any treatment, although, of course, treatment with chloroform, chloral, or Dover's powder may tide the child over the danger period, provided the other lines of treatment are being carried out.

I have records of four patients who developed convulsions on the third day, due to fulminant gastro-enteritis, and all four were treated with anti-dysenteric serum 20 c.c. subcutaneously and recovered.

6. Anæmia is always a concomitant or sequel of this condition and needs dietetic rather than medicinal treatment, for it would appear that these bacillary infections to a large extent paralyse the endocrine system of the child, and since this system is, to a large extent, responsible for the growth and metabolism of children, it is obvious that any method of treatment for the anæmia which does not take into account dietetics is going to fail, for I would remind you that "the vitamins are to the endocrines what the endocrines are to the economy." Therefore, when the child's digestion can manage it, fresh milk, eggs, green vegetables, and fruit, must form the principle articles of diet. If further corroboration of the above facts is wanted, I have only to remind you how often children who have been wrongly fed and badly dosed after acute gastro-enteritis suffer from skin affections, boils, and loss of hair. The only drug which I have any faith in is cod-liver oil, and whether given pure or as Ostelin, I think, matters little. A visit to the seaside or the hills, provided the food principles are carried out as above, is, of course, invaluable. Recently many authorities have been advising fractional doses of thyroid gland, combined with a full vitamine A, B, & C diet such as I have described in a previous article.

Constipation is frequently an after-complication and is best treated with milk of magnesia and paraffin.

Perhaps I have not done sufficient justice to that old sheet-anchor of mothers and practitioners—castor oil emulsion. It is not that I do not at times employ it, but because I wish you to realise that this fulminant disease requires and reacts better to the saline and alkaline treatment referred to. Castor oil emulsion, that is not more than 5 minims of the oil to the drachm of mixture, is, however, useful in mild infective cases, and in some convalescent cases where the more urgent symptoms have subsided.

Current Topics.

License in Tropical Medicine (Bengal).

UNDER orders passed by the Government of Bengal, Local Self Government Department, Medical Branch, No. 706 Medical, of the 6th March, 1926, candidates who complete the three months short term session at the Calcutta School of Tropical Medicine, and who appear for the examination at the end of this session will be eligible for the granting of a License in Tropical Medicine, given by the Faculty of Tropical Medicine of Bengal; and to apply the letters L. T. M. (Bengal) after their name. This rule has also been made with retrospective effect, and those possessing the former certificate for having passed the examination at the end of the short term session should apply to the Director of the School of Tropical Medicine for the new License form which replaces the former certificate.

The difference between a Diploma and a License is well appreciated in India; but, whilst there has always been a keen competition for the D. T. M. (Bengal) qualification, the short term classes have not been as popular, partly owing to the fact that at the examination only a certificate was given. The short term class is especially suitable for sub-assistant surgeons and junior medical practitioners; and it is hoped that the change will attract more applicants to take advantage of the facilities afforded by the short term class at the School.

The Effect of Military Service upon Hookworm Infestation.

AN interesting paper on "Hookworm Infection in Filipino Soldiers" is one by Major G. R. Callender and Capt. T. Bitterman in *The Military Surgeon* for October 1924, p. 434. In a survey carried out in 1907-1912, during the early years of the American occupation of the Philippines, the percentage of infections found was as follows:—

	Prisoners.	Bilbid	Filipino
	Prison.		soldiers.
	Per cent.		Per cent.
Hookworm ..	52		25.6
Ascaris ..	26		40.0
Trichuris ..	59		40.0

from which it would appear that the civilian population was much more heavily infested with hookworm than the Filipino troops.

In 1922 the authors studied the problem in Filipino soldiers, using a modification of Cropper and Rowe's

concentration technique, and examining in all 940 soldiers. Their findings were as follows:—

1. The rate of hookworm infestation among new recruits is 77 per cent.; among the whole group examined the average figure is 53 per cent.; among soldiers with over 10 years' service it has fallen to 18 per cent. Further, a curve which is given shows this steady decline year by year for the soldiers examined.

In other words, the civilian population, barefooted and living under insanitary conditions, are heavily infested. But during military service, wearing boots and living under better sanitary conditions, the percentage of infestations steadily falls year by year. It falls rapidly for the first four years of service, and thereafter declines more slowly.

2. With *Ascaris* infections, which are acquired via the mouth, the percentage of infection remains practically the same over the first ten years of military service. With *Trichuris* infections there is a slight but not very marked decline with increasing length of military service.

3. Among infected soldiers the average eosinophile count was 8.1 per cent. as against a figure of 6.4 per cent. for those showing no hookworm infection. The hæmoglobin percentage was actually higher for those infested, 86 per cent., than for the general group examined, 85 per cent.

(It would be interesting to obtain corresponding figures for British and Indian troops serving in India; and the problem is one which might be worth enquiry.)

The Incidence of Human Intestinal Protozoal Infections among Koreans.

AN interesting paper on this subject by Dr. J. F. Kessel, *rh.n.*, appears in the *China Medical Journal* for November 1925. Ludlow in 1923 commented on the high incidence of amœbic abscess of the liver among Koreans in Seoul; and Dr. Kessel's survey was conducted there during the period August-September, 1924. A total of 212 individuals was examined, including 80 hospital patients and 59 foreigners resident in Seoul. The number of faecal examinations was from six in 82 persons down to one in 47 persons. The author quotes a previously published table of his, however, in which the proportion of positive results found in one, two, three, four, five and six examinations is given, and applies corrections based upon this table where the number of examinations was scanty. In all positive findings, slides were prepared and stained by the iron hæmatoxylin method in order to verify the finding from stained preparations.

His results were as follows:—

1. Among the Koreans examined the incidence of *Entamœba dysenteriae* (*Entamœba histolytica*) infections was 41 per cent.; a figure 8.5 per cent. higher than for Chinese examined in the Peking survey.

2. Foreigners resident in Seoul showed a 25 per cent. incidence of infection; a figure more than twice that recorded in Great Britain and the United States. Of nine of them with symptoms suggestive of sprue, six showed infection with *E. dysenteriae*.

3. *Trichomonas hominis* was found to be much more prevalent during the Korean survey—(23 per cent. of Koreans found infected), which was carried out during the summer, than in Peking where the examinations were made mostly during the winter. It is interesting, further, to note that *Trichomonas hominis* was found in the pus of a liver abscess, together with motile *E. dysenteriae*, which had ruptured into the pleural cavity. This observation would appear to indicate that this parasite may pass into the blood stream from the lumen of the gut.

4. *Giardia intestinalis* was found in 18 per cent. of the Koreans examined; an incidence similar to that recorded by Dobell for Great Britain and by Stiles for Americans, but higher than that found in the Peking survey.

(The survey would appear to bring out three points:—
(a) That intestinal protozoal infections in man may be slightly more prevalent during the summer than during the winter months; (b) that *E. histolytica* infection is rather prevalent in Korea, and this would account for the prevalence of liver abscess; and (c) that *Trichomonas hominis* may at times invade the blood stream and the tissues.)

Variability in the Biochemical Characters of certain Bacteria.

A PAPER which is very interesting, but also puzzling, is one by Dr. A. Castellani, C.M.C., in the *British Medical Journal* for October 24th, 1925. We are accustomed to rely largely upon their sugar fermentation properties in the identification of bacteria of the coli-typhoid group. Working with typical strains, giving true sugar and serological reactions, Castellani shows that the sugar reactions of the members of this group may depart widely from the normal when the different species are living in association or are artificially mixed. Thus:—

(a) *B. typhosus* produces acidity but no gas in maltose. *B. morganii* has no action on maltose. Yet *B. typhosus* plus *B. morganii* together produce both acidity and gas in maltose.

(b) The same phenomenon occurred when a mixed culture of *B. typhosus* plus *B. morganii*, obtained from a stool, was inoculated into maltose.

(c) In mannitol and sorbite *B. typhosus* produces only acidity and no gas. *B. morganii* has no action. Yet *B. typhosus* plus *B. morganii* produce both acid and gas.

(d) The same phenomena occur with *B. typhosus* plus *B. proteus*.

(e) Flexner's bacillus produces acidity only, and no gas, on mannitol and maltose. *B. morganii* does not produce either acid or gas in either sugar. The mixture of the two organisms produces both acid and gas in both sugars.

(f) The same phenomenon occurs with Flexner's bacillus plus *B. proteus*.

The author's conclusions are as follows:—

It appears from my experiments that with regard to certain bacteria, when two species live in association or are artificially mixed, their mixture may present certain biochemical characters that neither species possesses when living separately. For example, *B. typhosus* alone produces acidity, never gas, in maltose, mannitol, and sorbite; *B. morganii* alone produces neither acidity nor gas in these substances; the mixture *B. typhosus* + *B. morganii* produces, however, both acidity and gas, although one would expect that by adding to a germ which produces simple acidity, never gas, a germ which produces neither acidity nor gas, there would still be only production of simple acidity.

The phenomenon of fermentation with production of gas of certain substances, such as maltose, mannitol, and sorbite, by adding to a germ which produces simple acidity in them, never gas, a germ which is apparently inert on those substances—that is, produces, alone, neither acidity nor gas in them—seems to depend to some extent on the fermentative powers of the second germ on certain other carbohydrates. For instance, not all bacilli inert on mannitol will cause production of gas in that substance when added to *B. typhosus*, which produces in it only acidity; a condition for the phenomenon to take place seems to be that the added germ, although inert on mannitol, must be capable of producing acidity and gas in glucose. It must be noted, however, that not every organism producing gas in glucose and neither acidity nor gas in mannitol will cause production of acid and gas in the latter substance when added to a producer in it of simple acidity, such as *B. typhosus*.

The subject is very obscure and requires much further investigation, but the fact remains that with regard to certain bacilli the mixture of two species may produce gas in certain substances although one species produces

only simple acidity, never gas, in them and the other neither acidity nor gas.

Laboratories for the Study of Abnormal Classes.

AN interesting project is one put forward by Dr. Arthur MacDonald, the Congressional Apartments, 100 East Capitol Street, Washington, D. C. for the establishment in America and other countries of laboratories for the study of abnormal classes. That prevention is better than cure is an old maxim with reference to disease; it should also apply in connection with crime, mental deficiency, and moral delinquency. What interests the social reformer is not that crime or insanity is on the increase or decrease, but the causes for such increase or decrease.

Dr. MacDonald suggests, as a first contribution to the problem, the establishment of one or more special laboratories in each country, each with a staff of one anthropologist, criminologist, psychologist, alienist, neurologist, and statistician, together with assistant personnel, with powers to undertake investigations in jails, asylums, and homes for the mentally defective. The one per cent. or less of humanity who constitute the inmates of such institutions are an unduly severe burden on the ninety-nine per cent. of healthy citizens who remain outside them. Crime in general is at present costing the United States more than a billion dollars a year; he suggests that it is worth while spending \$110,000 per annum to try and find out its root causes. Further, such institutions are especially suitable ones in which to study the causes of abnormality, whether mental or moral. Some of the arguments which he brings forward for the necessity for such study are as follows:—

1. The main purpose is to study the causes of crime, insanity, pauperism, alcoholism, defectiveness, degeneracy and other forms of abnormality, with a view to lessening or preventing them.

2. To find out whether or not there are any physical and mental characteristics that distinguish abnormal children from other children. Such knowledge would make it possible to protect children in advance and lessen the danger of contamination.

3. Exhaustive study of single typical criminals, which represent a large number, will give definite knowledge as to just how men come to go wrong, and to what extent their surroundings influence them as compared with their inward natures. This would make possible a rational application of remedies for these evils.

4. More exact knowledge of the abnormal classes will enable us to manage them better in institutions. Such studies will bring men of better education and training in control of the institutions, and increase interest in the professional study of these classes.

5. Proper and full statistics of the abnormal classes will alone justify this Bill.

6. To summarize and combine results already gathered by State and Federal institutions and governments, encouraging uniformity of method in collecting data and making such data useful generally to all states.

7. To lessen the enormous expense to governments of the abnormal classes by study of the causes of the evils that involve such expense.

8. As stated, abnormal personalities cost the United States at least one billion dollars annually. But crime alone may cost as much; thus pyromaniacs (seldom caught) destroy many lives and millions of dollars worth of property. There are also about ten thousand homicides a year, and many more cases of assault and malicious mischief in the country.

9. The prison is a good place for scientific study of man, for the majority of prisoners are normal, especially in reformatories, their previous environments, rather than their natures, being abnormal. Much of the knowledge gained, therefore, will apply to the normal. Moreover, prison conditions are favourable for scientific study, because the inmates rise, exercise, eat, rest and sleep regularly and at the same time there is the

same environment for all. Thus institutions for the abnormal may serve as humanitarian laboratories for the good of all people.

10. One general purpose of the laboratory is to determine more definitely the border line between the normal and abnormal. To study abnormal man, we must investigate normal man in order to have a standard for comparison.

11. It is not so important to know that crime and other abnormalities increase or decrease in this or that year; but it is important to know why there should be so much crime and abnormality as there is. Why should five per cent. of citizens cause so much expense and trouble to ninety-five per cent? These troublesome few might be greatly reduced if they were studied personally and in connection with their environment, as has been done with animals.

12. But it may be asked as to the 'practical' value of such studies? All facts about human beings, though not immediately available, are important; for any fact may be necessary to establish a new truth, in connection with other facts, discovered later; the history of science has shown this many times. To question the value of a fact, because it is not immediately useful is not only against science, but assumes what might be called mythological omniscience."

The anthropological study of criminals and of those mentally deficient is not new; Professor Lombroso's contributions being perhaps among the most notable to what is almost a new science. At the same time India, with her numerous institutions for such classes of the population, and with such peculiar factors as intoxicating drugs of oriental origin and use; differences of diet in different races and castes; wide differences of climatic and other factors; and wide diversity of ethnographical factors, would offer an ideal field for such a scientific study of the abnormal. There must be many medical men in India in charge of prisons, homes for the defective, etc., who would welcome advice as to the collection of data on such a subject on proper scientific lines.

The Treatment of Madura Foot.

WE have received the following letter from Dr. Andrew Balfour, Director, London School of Hygiene and Tropical Medicine; which we publish with much pleasure:—

Sir,

In the interesting communication on "A Case of Madura Foot treated by Chemo-Therapy. Apparent Cure" which Lieutenant-Colonel F. J. Palmer contributed to the *Gazette* for February 1926, p. 74, he states that Madura foot has hitherto been regarded as incurable, except by amputation. Until comparatively recently, and putting aside the few cases where early excision may prove effectual, no exception could be taken to this statement. Your readers may, however, be interested to learn that, in the *Journal of the American Medical Association* for October 11th, 1924, Audrain described an advanced and typical case of mycetoma of the foot where, seemingly, complete cure followed treatment with neo-arsphenamin and mercurochrome-220 soluble.

In the *British Medical Journal* for March 6th, 1926, p. 418, Mr. Hubert Chitty, M.S. (Lond.), F.R.C.S. (Eng.), records some remarkable results in the treatment of actinomycosis by tincture of iodine administered in milk. Five patients were treated by the administration of 5 to 10 minims, or more, of tincture of iodine freshly dropped into half a cupful of milk, taken orally three times a day. In four of these cases complete cure appeared to follow. In the other case, the patient appeared to have become cured, but later a fresh abdominal abscess developed, contaminated by staphylococcus infection, and he died. The idea of giving the tincture in milk is to obtain a more or less colloid preparation. In view

of his results in actinomycosis, it might be worth while giving this method a trial in mycetoma.

Yours faithfully,
ANDREW BALFOUR.

(Note.—We have taken the liberty of taking the following abstract from Dr. Andrew Balfour's review of Audrain's paper, in the *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 1924, Vol. XVIII, No. 4, p. 223:—

"Hitherto cases of advanced Madura foot have been considered food for the surgeon. In other words, the only real remedy for them has been amputation. Now it would seem, provided the results recorded by Audrain are confirmed, that some cases may be successfully treated medicinally. He cites the case of a Mexican youth, aged 18, who presented a typical Madura foot with many discharging sinuses and scars. A Wassermann reaction was negative, and the so-called fish-eye bodies were present in the pus. Unfortunately, however, the species of fungus concerned was apparently not determined.

In view of the lad's youth and splendid physical condition, Audrain decided to refrain from amputation and instituted treatment with neo-arsphenamin and soluble mercurochrome-220. The following are the details given:—

'Treatment was begun 21st January, 1924, with 0.3 gm. of neo-arsphenamin. By 25th February, six injections had been given, the last three of 0.75 gm. each. The patient rested one month with absolutely no improvement. 28th March, he was given 10 c.c. of 1 per cent. mercurochrome-220 soluble intravenously, and, four days later, 0.6 gm. neo-arsphenamin intravenously. He has received an intravenous injection of neo-arsphenamin, mostly 0.75 gm. weekly, and 10 c.c. of 1 per cent. mercurochrome-220 soluble intravenously weekly, alternately, having received up to 26th July eighteen injections of each. There was never any reaction, salivation or diarrhoea. The patient was discharged on the latter date. All the sinuses were healed, the swelling was all gone, the foot was freely movable, and to try out his ability to use it he walked twelve miles, 6th August, with absolutely no pain or discomfort."

It is to be hoped that other observers will test the efficacy of this combined therapy and report thereon.

Chronic Sunburn and Epithelioma of the Skin.

THIS was the subject of the annual oration to the London Dermatological Society by Professor Dubreuilh, Professor of Dermatology and Syphilography in the University of Bordeaux, and is reported in the *Transactions of the Society* for 1925, pp. 65 to 76. Professor Dubreuilh's address is so interesting a summary of a subject of both importance and interest in India, that we take the following abstracts from it:—

"It was only in the latter part of the last century that a distinction was made between heat rays and light rays, and that we have learnt the fact that light rays too can be harmful. It was proved by the similar injuries produced by a strong electric light.

Much work has been devoted to the study of the immediate lesions produced by the solar rays, but their late effects are less known, and it is these I intend to consider to-day. I must, however, say a few words about acute sunburn, because it enables us better to understand the later effects.

I suppose most of you have had the opportunity of getting sunburn, so that I need not give you a long description of it. I must, however, call your attention to the fact that during exposure to the sun you feel nothing more than a slight warmth which ceases as soon as you get into the shade. Several hours after erythema and a smarting sensation set in and goes on increasing during the first twenty-four hours. It is then that the trouble reaches its height, the skin is red

and swollen, blebs appear if the sunburn is really serious and the burning sensation is intense. After a few days the epidermis desquamates, the redness fades and the skin resumes its normal aspect but for a brown colour which is more or less marked according to persons, those having a brunette complexion browning more than the fair ones. The latter do not take a general tan colour but become freckled.

That sunburn was generally ascribed to the solar rays as a whole and more especially to the heat rays, appears from the expression sunburn.

Charcot, in 1859, observed accidents quite similar to sunburn on persons exposed to the rays of metal molten in the electric arc; nowadays erythema, due to electric arc light, is common and well known, and in all these cases the radiant heat is quite insignificant. Bouchard, in 1872, observed that the solar light passing through a red screen had no action on the skin, whereas the light transmitted through the violet screen could produce a sunburn.

Widmark, Finsen, Möller, by various experiments, have ascertained that the activity of a powerful electric light is not impaired by a thick sheet of water which absorbs heat rays nor by a lens of rock crystal, whereas it is very much diminished by a glass lens and more so by rock salt which stops the greater part of the actinic rays.

The result of these experiments is that of all the different varieties of rays which constitute solar light, the calorific, infra-red and red rays, which have the longer wave-length, have no action on the skin, and that sunburn is caused by the violet and ultra-violet rays of shorter wave-length, the same that act upon the photographic plate and also on plants.

Certain circumstances considerably increase the activity of solar light. Everybody knows how easily sunburn is acquired when boating, because the light reflected off the water adds its action to that of the direct rays. Light reflected from a snow field is still more active, and sunburn during an excursion on a glacier is so constant that it bears a special name in German, *Gletscher-brand*. On a snow field or on a glacier it is not necessary that the sun should be very bright: sunburn may develop with a cloudy sky, and more when mountaineering in winter than in summer, because though there is less sunlight there is more snow. The worst places are not the high rocks but the snow-clad valleys, which reflect light from all directions, especially if the snow is freshly fallen.

It is possible that reflection from a sheet of water or from a snow field increases the actinic power of light, not only by adding reflected light to the direct rays, but also by increasing the relative proportion of short wave-length rays.

Certain fluorescent substances, such as esculine or sulphate of quinine, for instance, increase the wave-length of a part of the light which goes through them, and in this way alter its colour and diminish its actinic power. In that way they are green or blue by reflected light and red by transparency. It is quite admissible that a sheet of water or of snow may do the reverse and shorten the wave-length of the reflected rays, thus increasing the amount of ultra-violet rays.

All people are not affected in the same way by the same exterior conditions. It is a well-known fact that people with a fair complexion, blue eyes and fair or red hair, become very easily sunburnt. After the erythema has faded, the skin remains more or less freckled, but not tanned. People of a brunette type may have a slight erythema at the beginning of the season, but after that take a tan colour which increases by further exposure. This diffuse pigmentation of the epidermis is a very efficient protection for the skin against the actinic rays, whereas freckles are not. Finsen exposed his forearm to the sun after having drawn across it a band two inches broad with black paint. After washing off the paint, the exposed parts appeared first red and later brown, whereas the painted part remained white. After another exposure of the bare forearm, the tanned parts were not affected, but

the previously painted band presented a solar erythema.

Brown people, like Hindus or Arabs, never get erythema solare, whatever be their exposure, still less negroes, whose epidermis is full of pigment. On the contrary, blond people only acquire freckles which are an insufficient protection. R. Bowles mentions the case of a man with a very sensitive skin who, after an excursion on the snow, had a violent sunburn, his face was swollen and covered with blebs but pitted with small depressions which corresponded to the situation of the freckles.

It must, however, be kept in mind that some persons may have a fair complexion and a sensitive skin with dark hair or dark eyes; the reverse may also happen.

Solar erythema is therefore caused by the short wave-length rays of the sun. After the acute symptoms have disappeared there only remains a certain degree of pigmentation which in turn disappears after some weeks. There is no evidence of what has taken place, but in reality an invisible alteration has occurred, which, increasing with the successive exposures day by day and year after year, with or without the occurrence of any acute erythema, results in deep changes in the structure of the skin.

Under the influence of old age, the fibrous tissue of the corium diminishes and is replaced by a very imperfect elastic tissue made up of a meshwork of short and knotty elastic fibres. The skin is consequently thinner, its elasticity is lessened and it is wrinkled and falls in loose folds. This change in structure and appearance is the only genuine senile alteration and is found all over the body in old age. But on uncovered parts, on the face and hands, more striking changes occur: discoloration, hyperkeratoses, etc., culminating in epithelioma of the skin. These also are generally considered as senile but are really due to quite other causes.

My first observations on the subject were published in 1896 in a paper on 'Circumscribed Hyperkeratoses,' read to the Third International Congress of Dermatology in London. I then called 'precancerous keratoses' a series of lesions which may remain benign for an indefinite period, but which may at any time develop into an epithelial cancer. *Keratoma senile* is the most common and characteristic of these precancerous lesions and is always found in connection with other so-called senile alterations of the skin. I was struck at that time by its localization on the uncovered parts of the body and by its frequency in country labourers, which made me think that light had an influence in its production. Later, in 1908, in a paper on 'Epithelioma of Solar Origin,' I confirmed and completed my first views on the subject.

I use the term *keratosis senilis* for the ensemble of changes in the skin which occur in old people on uncovered parts of the body and *keratoma senile* for the hyperkeratosis which is the most marked feature of that ensemble, and which, in the end, is the starting point of most epitheliomata of the face.

Keratosis senilis, which should be better named *keratosis solaris*, is a combination of four different lesions.

(1) A macular discoloration resembling freckles in the form of small and irregular brown macules, seldom very deep in colour.

(2) Red vascular patches formed by clusters of small veins.

(3) White achromic macules particularly marked on the lower eyelids and which are often, but not always, the result of the spontaneous cure of a keratoma.

(4) Keratomas, which are crusty or scaly patches, exceedingly variable as to size, shape and thickness. They may be as small as a hempseed or as large as a shilling, their shape is quite irregular and they may cluster into larger groups. There may be just a slight roughness of the thickened epidermis or brown scaly patches of thick, greasy, friable scales. When they are scratched off, there appears a red, shiny surface, covered by a thin epidermis. A little later, in a more developed lesion, the underlying corium is thickened, its surface is irregularly honey-combed with small

follicular depressions and so friable that the slightest scratching makes it bleed.

(5) Lastly, the keratoma becomes an epithelioma. The change from one to the other is marked by the scaly patch becoming crusty, by the skin becoming thickened and indurated, by the appearance of a tumour or an ulcer. It is to be noted that before the epithelioma is clinically discernible, the microscope shows characteristic epitheliomatous lesions.

On the hands keratosis senilis follows the same course of development, that is, patchy brown or white discoloration, vascular tufts and keratomas, but the latter, instead of being friable and greasy, are dark or black, dry, hard, and adherent, greatly resembling a bit of oak-bark stuck on to the skin.

These keratomas are the most typical examples of that large and interesting class of skin lesions which I described in 1896 as precancerous keratoses.

Precancerous keratoses, or broadly speaking, precancerous dermatoses, are a preliminary benign stage in the development of cancer and especially epithelioma; such are leucokeratosis of the tongue, Paget's disease of the nipple, arsenical keratosis, etc. They may remain quiescent and benign for an indefinite period, or on the other hand they may at any time become active and malignant. Their malignancy is not an accidental complication, it is the final step in their natural evolution. The precancerous keratosis is produced by certain definite agents, but once developed it may remain quiescent or may continue its evolution into cancer, even when the causative agent has ceased to work. Arsenical keratosis or leucokeratosis can give rise to cancer long after the patient has ceased to take arsenic or to smoke, and has undergone treatment for his syphilitic glossitis; the same is true of keratoma senile.

The topographical distribution of keratosis senilis is one of the best arguments in favour of the rôle of sunlight in its production. It affects exclusively the uncovered parts of the body and not even all, but only those which are exposed to the direct rays of the sun during work in the fields. According to the greater or lesser exposure the lesions vary from mere freckles to well developed keratomata or epitheliomata.

On the face, the parts most affected are the nose, the upper parts of the cheeks and the sides of the face and neck; the lower eyelids are more exposed than the upper. The forehead and temples are more or less affected according to the head-dress. This is well demonstrated in the part of France where I live: men wear a woollen cap, which leaves those parts exposed and epitheliomata of the ear are very common.

Not so in women, whose usual head-dress was the "foulard," a sort of head-kerchief.

Since the parts of the body directly exposed to the sun are most affected with epitheliomata, it is natural to expect that those people who by their occupation are daily exposed to the sun will be more likely than others to have epitheliomata, and such is the case.

Senile keratosis and its sequel multiple epitheliomatosis is a rural disease affecting especially agricultural workers. In 1896, wishing to collect cases of keratosis senilis, I examined all the inmates of the 'Hospice des Vieillards' where the old and infirm of the city are received. To my great surprise I found very few cases, all of whom had followed out-of-door occupations. In the out-patient department to which, on the contrary, patients come from the country districts, keratosis senilis is very common. Later on, reviewing several hundred cases of epithelioma of the face, I found that rodent ulcer is as common in the town as in the country and is independent of occupation, whereas the common form of epithelioma of the face and hands is much more frequent in the country and especially in those pursuing out-of-door occupations.

The same facts have been observed in 1909 by Bellini in Milano, and also in 1910 by MacCoy, of Vincennes, Ind., U. S. The latter further remarks that sunburn and solar keratoses are more common in country districts, whose soil is white and so reflects the light, than in those whose soil is red clay. I remember hearing

long ago the old surgeons in Bordeaux comment on the frequency of epithelioma of the skin in peasants of the Charente district, where the brandies of Cognac are produced. This is a very dry part with scanty vegetation in which the white chalk reaches the surface, which confirms MacCoy's observation.

It has been observed previously that people with fair skin and blue eyes are particularly susceptible to solar erythema.

The same holds true for the chronic effects of the sun rays. Old people affected with epitheliomatosis of the face are found to have been almost invariably of the blond type and are mostly to be found among northern races. Southerners, such as Mediterranean people, and especially brown or black races such as Arabs or negroes, never have sunburn or solar epitheliomatosis. I have no personal experience of yellow races, but I do not think they are much affected.

The influence of light on the development of epithelioma of the skin has long been known in the case of xeroderma pigmentosum, where it is evident. In this disease all the uncovered parts of the body, especially the face, are mottled with dark brown or black macules mixed with vascular tufts, achromic patches, keratoses and multiple epitheliomata, thus giving the same clinical picture as senile keratosis, except that the pigmentary macules are much more numerous and deeper coloured. The disease involves the face, nape of the neck, hands, forearms and often the feet; in fact, all the parts that are exposed to light. It appears in early childhood as soon as children go about freely, and epithelioma is frequent at 4 or 5 years of age. It attacks successively all the children of a family, but is not hereditary. Xeroderma pigmentosum is therefore an infantile form of the same disease as keratosis senilis and due to an excessive sensitiveness of the skin to the light, but in adults the latter coincides generally with a fair complexion, whereas such is not the case in xeroderma pigmentosum which affects young children who are not particularly fair and who may sometimes even have very black hair.

The Karzinon der Seemannshaut, described by Unna, is a disease affecting the face, nape of the neck and hands in German and Scandinavian sailors of middle age. The symptoms are very much the same as those of solar keratosis except that the freckles are more abundant and deeper coloured. It occupies an intermediate position between xeroderma pigmentosum and senile keratosis as regards age, incidence and general appearance, but is more nearly related to the latter, of which it is only a variety occurring in younger men with fair complexion and who, by their occupation, are exposed to solar rays reflected from the surface of the sea.

The general conclusion we may draw is that the alterations of the skin which are generally considered as due to old age and which culminate in epithelioma of the skin, are not manifestations of senility, but are the result of prolonged and repeated insolation whose effects accumulate and only become apparent after years of daily exposure. Just like acute sunburn, they are caused by the violet and ultra-violet rays, that is the short wave-length rays of the spectrum.

But the ultra-violet rays of the sun or electric light are not the shortest that are known, far shorter still are the x-rays, and they too have a powerful action on the skin.

A single strong dose of x-rays produces after a fortnight or so an erythema which develops slowly, fades after a week or two, desquamates and leaves a brown pigmentation. If the dose is stronger, the latency period is a little shorter and there occurs an excoriation or even necrosis. If the exposures are short but very numerous, as is the case in professional radiologists, the effect of each is not apparent, but they accumulate and produce alterations which are very like chronic sunburn. The skin is mottled with pigmentary and achromic spots, there are vascular tufts and hard horny excrescences which develop into epitheliomata. All this

is the exact repetition of solar keratosis, but in the x -ray keratosis there are in addition some special lesions such as dryness and cracking of the skin, brittleness of the nails and painful ulcers which are of nervous origin. The hands are most affected because radiologists formerly exposed their hands unwarily to the rays, but in this condition the last phalanges are just as much affected as the others and even more so.

We find here, therefore, an exact counterpart of solar keratosis, but x -rays are far more powerful, since daily and all day exposure during a whole lifetime are necessary to produce the full effects of sunburn, while exposure to x -rays for two or three hours a day during a few years is sufficient to produce the gravest radio-dermatitis.

According to Hall Edwards, persons of a blond complexion react more intensely to x -rays than others, and the skin which is most susceptible to light rays is also peculiarly susceptible to x -rays.

Another curious similarity between ultra-violet and x -rays is to be found in their action on white glass. After a certain number of hours' work, x -ray tubes take a violet colour, but only in the hemisphere through which the x -rays are emitted; this is due to the oxidizing of the manganese used for bleaching white glass. The same occurs under the influence of sunlight. White glass exposed to the sun a few years takes a distinct amethyst tinge. It might therefore be suggested that the action of the sun on the skin is due to x -rays contained in solar light, but if such was the case thin garments would not constitute as effective a protection as they do.

If we now consider the other extremity of the solar spectrum, we find red and infra-red rays of larger wave-length and also calorific rays which have no part in producing ordinary sunburn. Obscure calorific rays, of larger wave-length than the visible spectrum, produce the ordinary heatburn in which the pain is instantaneous and the redness appears immediately; if the burn is more intense, blebs appear in a few minutes and necrosis is immediate.

There are also lesions which may be called chronic burns and have some likeness to chronic sunburn and to chronic radio-dermatitis.

The lesser grade is represented by the reticular pigmentation which is commonly observed at the end of winter on the shins of people who, during the cold weather, sit all day before a warm stove; it is also seen on the legs and thighs of old women who sit in the streets selling newspapers with their feet on a stool containing live charcoal, which in France is called a "chaufferette." The lesions begin by purple streaks, slightly thickened, which later turn to a deep grey and form a meshwork which does not correspond to the veins as would seem at first sight; it generally disappears in the course of summer.

I have not observed personally any more serious complications, but such are described by Neve in the *British Medical Journal*, December 29, 1923, "On Kangri-burn Cancer."

The kangri is an earthenware bowl 5 or 6 in. in diameter, contained in a wicker basket; it is heated by means of wood charcoal and is worn by the poorer class of Kashmiris against the skin under a loose garment, resting on the belly when they stand or between the thighs when they sit.

Neve has from 1881 to 1923 operated on 2,491 cases of epithelioma of the skin, of which 2,000 were due to kangri-burns and were situated on the abdomen or thighs. I do not think any single European surgeon or dermatologist has seen a like number of epitheliomata of the skin outside of the face.

Owing to the constant application of heat, the skin of the thighs and abdomen appears dry and horny, with a reticular brown discoloration which seems to mark out the course of the superficial veins and with pigimentary macules and white scars. Every degree of

chronic dermatitis may be met with, from a mere redness, with or without desquamation, to thickened patches, warty projections or horny outgrowths. These latter grow out into epitheliomatous tumours or ulcerate deeply; in 50 per cent. of the cases the lymphatic glands were involved and 20 per cent. recurred after operation. The seats of election of the growths are the inner sides of the thighs and the anterior surface of the abdomen, above or below the umbilicus, but never on the back or on the extensor surface of the limbs. The disease is considerably commoner in men than in women, owing to the less continuous use of the kangri by the latter.

This mottled appearance with pigmentary and scaly patches presents the most striking analogy with senile keratosis or chronic radio-dermatitis. Woodhead, quoted by Bashford, has observed several cases of epithelioma on the legs of railway stokers who are constantly exposed to the heat of the fire.

Some of these cancers may be due to the scars of burns, but as Neve notices, such is not always the case. He ascribes them to chronic irritation, but every chronic irritation is not, in my opinion, capable of producing cancer; precancerous dermatoses are due to specific irritations, arsenic, tar, sunlight, etc., but not to chronic inflammation as such.

We are familiar with a very large and continuous series of rays, differing principally by the length of their waves, which range from certain Hertzian rays whose wave-length reaches 20,000 metres to the gamma-rays of radium. Some of them have a recognized action on the skin; these are the calorific rays, the violet and ultra-violet rays of shorter wave-length, and the Röntgen rays, whose waves are shorter still; the three form a very remarkable comparative series.

The calorific rays are the longest; the burn caused by their action on the skin is immediately felt, and according to their intensity an erythema or necrosis is produced which is almost instantaneous, no period of latency intervening. By their prolonged and repeated action, they can produce mottled pigmentation, precancerous keratoses and epithelioma, but that is a very late and rare occurrence.

The violet and ultra-violet rays have shorter waves by one-half and are the most active on the photographic plate. Their action on the skin, even if it is intense, is not experienced immediately, several hours elapsing before the patient feels a smarting and the skin becomes red; blebs and superficial ulceration appear only the next day; there is never much necrosis. The graver lesions of chronic sunburn appear only after years of daily insolation.

The Röntgen or x -rays have much shorter waves still. Their action on the photographic plate is less powerful. The latency period of the acute burn is much longer and reaches ten or fifteen days, during which the skin shows no change, and it is only after that length of time that the skin reddens and, if the exposure has been severe, ulceration or necrosis appears. The pain is much less than after a sunburn and especially than after a heatburn, and the ulceration, slower in its appearance, is also slower in its healing. The chronic changes of the skin occur sooner than after sunburn; they often appear after a few years of very moderate exposure amounting only to a few hours in the week.

On the whole all these rays have very much the same effect on the skin, but as the wave-length becomes shorter the latency period of the acute burn becomes longer and the pain less; the chronic effects become more and more early in their appearance and serious in their result.

The three can produce cancer quite independent of any parasitic interference. There are many other radiations of a similar character about which we know nothing, which surround us and penetrate us and which are perhaps the unknown cause of certain diseases.

Nephritis and Intestinal Infections.

By Dr. H. B. DAY.

(*Lancet*, October 24th, 1925.)

In a paper in the *Lancet* five years ago Dr. Day stated that nephritis, as met with in Egypt, was usually due to bacilli of coliform type derived from the intestine. Dr. Day now analyses 100 cases of nephritis with oedema admitted to the Kasr-el-Ainy Hospital, Cairo, during the last few years.

A simple division of the series into (a) acute, (b) syphilitic, and (c) chronic forms has been made. The presence of abundant blood casts or cellular casts in the urine has been taken as the main criterion of an acute nephritis. To this group one-third (34 cases) of the total number belong. In five patients out of the total of 100 there was strong evidence that syphilis was responsible for the renal lesion. The remaining group, comprising 61 out of 100 cases, is mainly composed of chronic forms of nephritis.

In 85 per cent. of the acute cases there appeared a causal connexion between the renal inflammation and some antecedent or concomitant infection. A similar connexion could only be established in a minority of the more chronic forms, for the patients had often forgotten slight illnesses in the past, and the appearance of oedema only fixed the date of gross renal failure and not necessarily the time of onset of kidney disease. Among 27 cases of acute nephritis whose clinical history was recorded, no less than 20 had been incapacitated by a definite illness for some time prior to the appearance of renal symptoms. This history was often substantiated by the persistence of such antecedent symptoms after admission to hospital, while other patients showed similar signs which had not been the subject of complaint owing to their milder nature.

These preceding conditions are tabulated below:—

	Antecedent history of	Persisted on entry.	Found in others.
Fever—generally prolonged	8	6	6
Fever followed by dysentery or diarrhoea.	7	4	2
Acute dysentery ..	5	1	2
Total ..	20 (of 27)	(21 of 34)	

In no instance could an antecedent fever be identified with scarlet fever; the prolonged course was usually sufficient to negative this.

Definite signs of *Bilharzia mansoni* infection were present in 55 per cent. of acute cases of nephritis, a much higher proportion than is found among hospital patients in general.

Urinary bilharziasis was found in one-third of the renal cases, an incidence too low to be significant in itself, considering the wide prevalence of this disease.

Ankylostomiasis was frequently associated with nephritis, though much less often than affections of the large intestine.

A routine bacteriological examination of the catheter urine was made in every case.

In cases of acute nephritis positive results from the first culture were almost invariably obtained.

The urine from cases of chronic nephritis showed a general correspondence between the microscopical picture of the sediment and the bacteriological examination. When cells were visible, included in the casts or free, a positive culture was usually obtained either from the fresh or the incubated specimen. If only granular and hyaline casts were present the urine proved sterile in the great majority of cases.

The three uncomplicated cases of syphilitic nephritis showed a sterile urine.

From patients whose urine contained definite collections of pus cells, usually from a cystitis complicating

old bilharzial disease, a growth of staphylococci was usually obtained, either pure or admixed. When there was much pus a bacillary or mixed growth was the rule. Streptococci were found in one case of septic nephritis.

In uncomplicated cases of nephritis a pure growth of bacilli of intestinal types was generally found on culture of the urine. Their cultural properties were investigated by Dr. J. K. Clarke, who found that most belonged to the coli-typoid type.

Agglutination tests on patients yielded unsatisfactory results, in keeping with the similar experience of pathologists regarding simple bacilluria.

As a result of the investigations the conclusion seemed warranted that most cases of nephritis in Egypt arose as a complication of an intestinal infection. Suitable cases to be treated on this assumption. Some forms of chronic dysentery of amoebic or bilharzial origin responded to emetine injections and showed a distinct improvement in the renal condition. Similarly, patients with nephritis complicating ankylostomiasis benefited by specific treatment.

For acute cases of nephritis and pyelitis when bacilli were plentiful in the urine, the free administration of alkali appeared beneficial, as in bacilluria. Urinary antiseptics were of little avail.

Vaccine treatment proved the best means of treatment in most cases of bacillary nephritis.

While an autogenous vaccine was naturally preferred, equally good results were often obtained from an allied strain of organism.

The first patients selected for vaccine treatment were non-resolving cases of nephritis in whom oedema persisted. These reacted to doses of 25 to 50 millions as a rule. But when the nephritis is acute, with oliguria or fever, or if high albuminuria is present, the kidneys seem much more sensitive and such doses may do more harm than good. On the assumption that the intestinal tract is the original source of bacillary infection, immunisation by the oral route appears a logical procedure, following the observations of Besredka and other French workers. The immediate response to such treatment shown in one case suggests that the dissolved antigen in the vaccine may be responsible, as has been shown by Perlweig and his co-workers to exist.

The Ravages of the Chiropractors.

DR. E. S. BLAINE in the *Journal of the American Association* of October 31st, 1925, reports three cases in which forcible manipulations of the neck have resulted in forward dislocation of the atlas. In one case death resulted. The patients were 18, 29 and 6 years old and the fatality occurred in the male of 18 years.

The Infantile Diarrhoeas.

DR. W. C. DAVISON in the *American Journal of Diseases of Children* of July 1925, records observations made at the Johns Hopkins Hospital. He believes that there is an undetermined primary cause which may consist of heat, fever, infectious disease or overfeeding; with an unsuitable diet. From one or more of these causes there follows a reduction in the duodenal enzymes and an accumulation of undigested residue which becomes invaded by bacteria of the colon group. Irritant products resulting from the above cause increased peristalsis. To this group must be added the bacilli of dysentery which act in a specific manner.

Stovarsol in Amoebic Dysentery.

To the numerous laudatory reports on stovarsol is added one by Dr. F. M. Johns and Dr. S. C. Jamison of New Orleans. In the *Journal of Tropical Medicine and Hygiene* of November 2nd, 1925, they report excellent results in 27 cases of acute and chronic amoebic dysentery. The drug in 0.25 gramme doses thrice daily

for a week caused complete subsidence of symptoms. Most of the patients received a second course of treatment after an interval of 7 to 10 days. Twenty cases were followed up of which three relapsed clinically and another showed cysts.

It is now clear that stovarsol is a drug of considerable value in the treatment of amebic dysentery, but it is not wise to rely on it to the exclusion of emetine, especially in acute cases and in hepatic complications.

Arsenicals in Cardiovascular Syphilis.

DR. B. J. GOLDBERG in the *Boston Medical and Surgical Journal* of October 22nd, 1925, calls attention to the fallacious judgments resulting from reliance on a negative Wassermann reaction. The reaction may be negative in early cases. Treatment should be persisted in in all cases. In aneurysms and acute dilatation it is safer to depend on intramuscular mercury and iodide of potassium, while in early cases the salvarsan group is best.

In doubtful early cases a course of mercury and iodide or a provocative course of arsenicals may help in clearing up the diagnosis. The paper should be read by those who are interested in this important subject.

Food Manipulation in Relation to Health.

British Med. Journal, September 26, 1925.

DR. WILLIAM G. SAVAGE, Country Medical Officer of Health, Somerset, made the following remarks in his contribution to the discussion on food manipulation.

Dr. Savage suggests that our knowledge is far too recent to enable positive statements to be made as to the effect of heat upon vitamin content, and that while as regards some food manipulations, such as the production of white flour, there would appear to be clear evidence of vitamin loss, for others we cannot yet speak definitely.

He goes on to ask if there is evidence that considerable sections of the community so feed themselves that they receive insufficient vitamins to maintain full bodily health. It is a plausible hypothesis to correlate deficiencies in health of our population with inadequate vitamin intake, but he has not come across any evidence which entitles us to affirm that the methods of food consumption of sections of the community are such that they ensure a deficiency of vitamins, and that this deficiency is definitely related to conditions of ill health. At present it is purely an assumption.

A third consideration is whether there is any evidence associating some particular disease, or form of malnutrition of a particular section of the community, with a deficiency of vitamins or other food essentials in their diet.

Assuming that food manipulation materially damages vitamin content, we have no evidence that the dietary habits in England are such that the proportion of such foods consumed is large enough to reduce to any material extent the vitamin requirements below a safety margin. It has to be remembered that the amount of vitamins required is extremely small, and it may well be true that even with a diet containing a large proportion of manipulated food the rest of the food intake may give all the vitamins required for full health.

Recently the conceptions of vitamin deficiency have been given a pathological basis. Cramer, Findlay, McCarrison, and others have brought forward striking experimental evidence that deficiency of vitamins is associated with degenerative changes in the mucous membrane of the intestines and other organs, and that this is associated with a diminished resistance to bacterial infection from the small intestine. Such pathological conceptions are of great interest and importance, but are up to the present associated with marked deficiency of vitamins in experimental work upon animals.

If these theories are true we should expect definite clinical confirmatory evidence. For example, countless children have been fed upon boiled milk without the addition of any added vitamins, and yet reliable observers have failed to find any evidence of disease from vitamin deficiency, although definite disease will result if vitamins are completely absent. Cramer remarks by all means let us advocate the importance of vitamins in the diet, but not on grounds we cannot substantiate. There is a danger that the weight of public health activities may be diverted into directions in regard to which we are not yet in a position to speak with unimpeachable authority.

Discussion on Malignant Disease of the Pelvic Organs.

British Med. Journal, August 15, 1925, page 279.

PROFESSOR B. P. WATSON dealt with the problem of cancer of the uterus. He laid stress on Frank's statistics which show that 97 per cent. of all cancers of the cervix occur in women who have borne children.

The fact that a woman has had one child predisposes her to cancer of the cervix; that predisposition is almost certainly due to injury of the cervix. If that injury is followed by chronic infection and catarrh, as is so frequently the case after deep lacerations, the predisposition is increased.

If this factor of local irritation, present in the vast majority of women who develop cancer of the cervix, were more fully recognized and more effective means were adopted to eliminate it, would not the incidence of cancer of the cervix be diminished? That diminution would be brought about, first, by abstention from all procedures which tend to produce deep lacerations, such as forcible dilatation of the cervix in labour and the application of forceps before completion of the first stage; and, secondly, by the thorough treatment and, if necessary, repair of existing lesions. Women should be made to understand that long-continued leucorrhoeal discharge indicates a diseased condition and calls for investigation and treatment.

A careful examination should in all cases be made, and the cervix inspected through a speculum. If the laceration is a deep one and the lips of the cervix are everted and catarrhal a repair or amputation should be advised.

It is extraordinary how women will allow these vaginal discharges to continue over a long period of years without seeking relief therefrom. A similar condition in any other part of the body would lead them to seek advice immediately.

We must look to the early diagnosis of cancer itself for a diminution in the mortality of the disease. Women must be made to realize that the occurrence of any abnormal bleeding, or the change in the character of any existing leucorrhoeal discharge, may be of serious import, and should lead them immediately to seek medical advice. A very large number of women know the import of those symptoms, but abstain from mentioning them because they fear that cancer may be diagnosed. It is therefore important that along with any publicity campaign for the information of women regarding those symptoms emphasis should be placed on the fact that cancer, if detected early, is a curable disease; that at first it is a purely local condition and in no sense constitutional.

Whilst the disease is commonest at about the time of the menopause, it may occur in quite young women. Schmitz found that it occurred before the thirty-sixth year in 11.9 per cent of his cases.

In most cases the menopause has been established for some years. The first symptom may be a slight amount of vaginal bleeding or simply a watery discharge which, in the course of time, changes to a blood-stained one. Such symptoms in a woman past the menopause should call for immediate investigation. Cancer of the body, while commoner in nulliparae than cancer of the cervix,

is not essentially a disease of nulliparæ. In Norris and Vogt's cases only 26 per cent. of all the cases of cancer of the body were nulliparæ.

Every woman complaining of abnormal vaginal bleeding is entitled to the most thorough examination. She must never be put off with drugs or douches. If digital examination reveals nothing the uterus must be explored. Many cancers of the cervix begin within the cervical canal and are inaccessible to the examining finger until they are far advanced. Those cases are very deceptive, even in their advanced stages, as the disease extends outwards towards the paracervical tissue and may scarcely reach the external os.

If any exploration of the uterus is necessary, and especially if curetting has to be done, the diagnosis should be established one way or the other there and then, and, if cancer is diagnosed and the case is operable, the operation should be proceeded with at the time. In the case of cancer of the body the naked-eye appearance of the curettings is usually quite characteristic; in doubtful cases frozen sections should be made. If a piece has been excised from the cervix and immediate diagnosis is impossible the area of excision should be thoroughly cauterized.

The treatment of early cases is believed by Dr. Watson to be operation preceded by radium treatment.

In the border-line, and in the advanced cases, radium treatment is the only one which holds out any hope. By it the local disease is checked, and often completely eradicated, with a disappearance of the vaginal discharge, and very often a marked improvement in the general condition of the patient. In a large number life is very definitely prolonged, and in some an absolute cure is effected.

Discussion on the Pituitary.

Edinburgh Medl. Journal, November 1925.

THE following extracts from the opening remarks by Sir Edward Sharpey Schafer, F.R.S., at a meeting of the Edinburgh Medico-Chirurgical Society on 1st July 1925 will interest our readers.

Professor Schafer pointed out that the pituitary consists of four parts, which are very different from one another in structure and probably in function—*anterior*, *intermedia*, *tuberalis*, and *nervosa*.

Attempts have been made to determine the functions of the different parts of the gland by administration, in various ways, of extracts made from them.

With regard to the *pars anterior* and *pars tuberalis*, very little definite information has been obtained by this method. This is probably because the effects produced by their secretion are slow in action and mainly affect metabolism. In one case only (that of the salamander, *Amblystoma*) has it been shown that feeding with anterior lobe produces a distinct effect on growth. Uhlenhuth found that if the metamorphosed larvæ of *Amblystoma* are fed with anterior lobe, as against larvæ fed with worms or with liver, he could produce creatures which relatively to those met with in nature are gigantic. This is indeed what one might have been supposed from the fact that giants of the human species are always found to have an enlarged anterior lobe; although experiments on mammals have not yielded results of such a positive nature as those obtained by Uhlenhuth in amphibian larvæ. Recently, however, more positive results have been obtained in rats, in connection with anterior lobe feeding after anterior lobe removal.

With regard to the posterior lobe, i.e., *pars intermedia* + *pars nervosa*, the effects of administration are more pronounced, or at any rate more acute. The first results of this nature were obtained about thirty years ago upon the vascular system by Dr. George Oliver and Sir Edward Schafer. They showed that intravenous administration of the gland produces an enormous rise of blood pressure due to contraction of arterioles.

Other effects of interest which are produced by posterior lobe extract are (a) that it causes action of the bowel, and (b) that it has an intense action upon uterine muscle. It is also noteworthy that the extract, injected intravenously, causes outpouring of milk from the full mammae of a lactating animal. The outpouring, however, only occurs if the nipple is incised or canalised. The effect is due to the contraction of a thin layer of plain muscular fibres which surrounds the alveoli.

Further, extract of posterior lobe has a double action on renal secretion. Injected into a vein it causes diuresis, which may be very marked. On the other hand, if diuresis is already present and the extract is injected under the skin, the secretion of urine rapidly comes down to normal. The same is found to be the case with diabetes insipidus and with polyuria however produced, as for example by ingestion of large quantities of water, the effect of subcutaneous injection being always antidiuretic.

Lastly, we may consider the functions of the pituitary as determined by removal, by injury, and by disease. It is usually held that complete removal of the pituitary body in adult animals is certainly followed by death.

Partial removal of the pituitary is usually not followed by death but lesions of the gland, especially of the anterior lobe, are correlated with a diminished rate of growth in young animals, so that as compared with controls the operated on animals remain small and dwarfish, and show otherwise a considerable arrest in development especially of the sexual organs.

One result of partial injury to the gland or of interference with its vascular supply is a tendency to deposition of adipose tissue, usually combined with atrophy of the sex organs, producing a syndrome which is closely paralleled by the clinical syndrome associated with the name of Fröhlich.

Results of disease:—(1) It was shown by Pierre Marie in 1886 that the condition which he described under the name of *acromegaly* is produced by an enlargement of the gland. He himself at first thought this to be of a destructive character, but it has since been shown to be adenomatous, and probably related to an increase of function of the anterior lobe, which is the part affected, rather than to a decrease. The condition is characterised by a great increase in size of the bones of the skeleton and hypertrophy of the connective tissue generally. When it commences in youth, before the epiphyses are joined to the diaphyses, the bones of the limbs become greatly elongated, and the individual tends to assume a gigantic stature. In fact, as Woods Hutchinson and others have shown, gigantism is a condition of *acromegaly* which has commenced before the growth of the bone in length has ceased.

(2) Another affection which is certainly closely related to the pituitary is that known as *dystrophia adiposogenitalis*, the first case of which was described by Fröhlich. Whereas *acromegaly* may be considered to be an affection characterised by *hyper*-pituitarism or increased function of the anterior lobe, *dystrophia adiposogenitalis* appears to be characterised by *hypo*-pituitarism or diminished function.

(3) A third affection which is related to the pituitary body is that known as diabetes insipidus. Experimental polyuria, which is exactly the same thing as the diabetes insipidus met with in the human subject, can be produced by injury to the pituitary body. There are strong reasons for believing that the effect of such injuries is humoral and not nervous. If it were nervous it would certainly show itself at once, but it does not occur immediately and is not developed for a couple of days. It is, however, more easy to suppose that the effect is due to stimulation of the pituitary body, thus causing an increased outpouring of the diuresis-producing material which we know to be produced in the *pars intermedia* and to be passed into the *pars nervosa* and third ventricle, and which, for aught we know, may also be produced by the *pars tuberalis*.

Reviews.

ANALYSIS OF MEDICAL JURISPRUDENCE.—By Dr. M. A. Kamath, M.B. & C.M. Second Edition. Mangalore: Sadananda Co-operative Printing Works, Ltd., 1925. Pp. 162. Price, Rs. 3-8.

THE compiler has enlarged this edition by adding a chapter on life assurance, and appendices describing methods of post-mortem examination, and forms of certificates in common use. The book has been revised and certain points of great importance to the general practitioner, notably in connection with criminal abortion and poisons, have been stressed.

The book has gained in value by these additions, but would have gained even more in value if the compiler had taken this opportunity of collating his collection of facts in the light of his own experience and stressing them from the point of view of their importance as evidence. The treatment of poisons is unnecessarily theoretical, e.g., in connection with the treatment of acute arsenical poisoning the antidote to be used is set down as follows:—

1. Saturated solution of ferrous sulphate 100 parts.
2. Calcined magnesias 88 "
- Water 100 "
- Instead of which
1. Liquor or Tinctura ferri perchloridi .. oz. 1½
- Water a wineglassful or oz. 2
2. Sodium carbonate (washing soda) .. oz. ½
- Water half a tumblerful or oz. 5½

mixed and administered would have been more practical. The compilation suffers from the defect that while its facts are fully collected, they are presented in an uncritical manner, and it is to be hoped that this will be rectified in the next edition.

The book remains as before a useful pocket text-book companion to help students through their examinations.

BUCHANAN'S TEXT-BOOK OF FORENSIC MEDICINE AND TOXICOLOGY.—By John E. W. MacFall, M.D., D.P.H., M.B., Ch.B. (Vict.), Ph.C. Ninth Edition. Edinburgh: E. & S. Livingstone, 1925. Pp. 446. With 58 illustrations. Obtainable from Messrs. Butterworth & Co. (India), Ltd., Calcutta. Price, Rs. 11-4 net.

THE fact that this work has reached its ninth edition speaks for itself. The first half is devoted to medical jurisprudence. This contains some very good chapters and sections among which we may select that on the criminal responsibility of the insane as being one of the best. An interesting account with an illustration is given of gunshot wounds. Modern features are a description of the procedure necessary before a body may be cremated, and an account of judicial electrocution. The tracings showing the effect of judicial hanging on the pulse are of uncommon interest. The subject of finger-print identification is adequately dealt with. The writer is at pains clearly to present in full detail the various legal enactments bearing on the work of the medical practitioner, and this is in our view the strongest feature of the work.

As is often the case with books on forensic medicine and toxicology, the sections devoted to the analytical procedures are hardly up to the standard of those on jurisprudence. In the chapter on bloodstains, for example, no mention is made of the benzidine reaction which is perhaps the most important of all the colour reactions of blood. The importance of blood spectroscopy warrants a plate with wave length scale rather than the diagram given. We do not care for the procedure described for the removal of a bloodstain from a weapon by heating the latter, since this involves the risk of coagulating the serum proteids which would preclude the subsequent application of biological tests. We do not understand the statement made on page 153 that

"semen does not contain albumen." In the section on poisons the absence of any reference to biological tests performed on the Stas-Otto extract for the detection of alkaloids is an important omission. In the section on cocaine we think the important permanganate test of Hankin should have found a place. The numerous illustrations are generally speaking good. No mention is made of the identification of hairs which is an important medico-legal question. Recent events of medico-legal interest are duly noted, among which we may mention the important matter of the poisoning of men employed in submarines by arseniuretted hydrogen liberated from arsenic contained in battery plates. The book is well up to date in many important respects, is well written and well printed on good paper.

Notwithstanding these criticisms on the analytical sections the book is a good one and we can recommend it.

POST-MORTEM APPEARANCES.—By Joan M. Ross, M.B., B.S. (London), M.R.C.S., L.R.C.P. London: Humphrey Milford. Oxford University Press. Pp. 216. Price, 7s. 6d.

THIS is a small work dealing with the gross appearance seen at post-mortems in affections of different kinds involving the various 'systems.'

There is also a useful chapter detailing changes presented when death has resulted from causes other than disease, and, at the end, an appendix of tables giving average anatomical normal weights and measurements.

The descriptions are concise and given in sufficient detail for students and practitioners, and to them it can be heartily recommended.

HANDBOOK OF PATHOLOGY.—By C. Y. Wang, M.D. (Edin.), B.Sc., F.R.C.P. (Edin.). London: John Bale, Sons & Danielsson, Ltd., 1925. Pp. 513. Price, 21s. net.

IN producing this book on pathology the author has by no means followed the beaten track. He has not adopted the usual division into the general and regional pathology but the work has been divided into chapters according to the nature of the tissue-changes. For example there are successive chapters on degenerative changes, oedema, hyperemia, thrombosis, infarction, atrophy and so forth. Each chapter first contains an account of the aetiology of the particular tissue change and then proceeds to detail its more important regional manifestations. It was naturally not possible to maintain this arrangement throughout the book; in the latter half of the book it was necessary to have chapters on such subjects as the diseases of the blood and blood forming organs, on diseases produced by specific organisms and on diseases due to filter passers.

The book is essentially one for the junior student and the arrangement is such that it should make a special appeal to this class of reader. The first two chapters which describe the morphology and the means of reproduction of the cells are particularly good from this point of view. As far as morbid anatomy and morbid histology is concerned the book is particularly good; there are a large number of very excellent illustrations. The descriptions of the pathology of diseases due to specific organisms appear to be poor, more especially in the case of diseases confined to tropical countries; this is particularly disappointing in view of the fact that the author is the Professor of Pathology in the University of Hongkong.

As a text-book of morbid histology one can thoroughly recommend this book to the student.

SELECTED PAPERS.—By E. T. Paul, D.Sc., F.R.C.S. London: Bailliere, Tindall & Cox, 1925. Pp. viii plus 284, with 23 plates. Price, 16s. net.

THIS collection of papers has been republished by a group of Liverpool surgeons as a token of their admiration for one of the outstanding figures of the last generation of British surgeons, who has now attained his 75th birthday. The papers here republished date

back to 1881 and a perusal of them impresses one not only with the progress which surgery has made during that time, but with the improved facilities which we enjoy nowadays for making a diagnosis, as compared with those available to the last generation of surgeons.

The first paper deals with the remote lesions of syphilis and aims at proving that fibroid changes in the viscera, lardaceous disease, aneurism and similar changes are largely the result of syphilis. The evidence brought forward is purely clinical and post-mortem and has since been corroborated beyond doubt by the Wassermann reaction, a remarkable tribute to the clinical acumen of the writer.

The early history of intestinal anastomosis is exemplified by a paper published in 1891 detailing some experiments in dogs, using decalcified bone tubes. Posterior gastro-enterostomy is described in 1892 as a difficult and often impossible operation and numerous experiments with bone plates are described, which give a vivid idea of the difficulties which beset the pioneers in these fields of surgery. Mr. Paul's name will always be associated with the simplest and safest method of resection of the large intestine and in a series of papers we find here the history of the famous glass tube and of his early failures with attempts at primary resection. Pylorotomy was an operation with a 50 per cent. mortality in 1907 and was performed only for cancer of the stomach; it is now one of the most commonly performed of gastric operations, with a mortality of less than 10 per cent. in non-malignant cases.

Mr. Paul's views on the operation for appendicitis are especially interesting, in that surgical opinion has gradually receded from the "operation at sight" teaching to a position not very different from that advocated in 1906. There are many pathological papers which are models of accuracy of observation, whose conclusions stand good to-day. Altogether a most interesting volume to all present-day surgeons.

SKULL FRACTURES.—By William H. Stewart, M.D., Paul B. Hoeber, Inc., New York. Pp. xxix plus 64, with 44 full page plates and 49 text illustrations. Price, \$12.00 net.

THIS book is one of the series of monographic x-ray atlases edited by James T. Case, M.D. It contains 44 full page plates and 49 text illustrations. It is a valuable work and fully emphasises the importance of systematic examination of the skull by x-rays in all cases of suspected fracture.

This volume is produced in the same style as the preceding four volumes. The text is large and clear and the reproduction of the skiagrams in most cases excellent. The detail in some of the skiagrams however is not good and one cannot help thinking that the author has drawn on his imagination in some of the markings thereon.

On the whole, while the work bears some of the stigmata of mass production it deserves a place on the shelves of every radiologist and surgeon, partly on account of the amount of material here made accessible to the student of skull injuries, and partly because it is one of a series of works which is bound to become classic.

MEDICINE MONOGRAPHS. VOL. VI.—INSULIN.—By J. J. R. Macleod and W. R. Campbell. Baltimore: The Williams & Wilkins Co., 1925. English agents: Messrs. Baillière, Tindall & Cox, London. Pp. 242. Price, 20s. net.

We heartily welcome the appearance of this book, especially as it comes from the pens of Macleod and Campbell whose association with the discovery and further developments of insulin from the view-point of the treatment of diabetes is too well known to require mention. The book is divided into two parts; one part deals with the physiological and the other with the clinical aspects of insulin, written respectively by Prof. Macleod and Dr. Campbell, working in the Department of Medicine and Physiotherapy in the University

of Toronto, both of whom are recognised authorities in their own spheres of work.

Part I of the book, dealing with pancreatic physiology, begins in the introduction with a brief survey of the literature dealing with the anti-diabetic function of the pancreas and describes the gradual stages by which the successful isolation of the anti-diabetic hormone of the pancreas—insulin—was made possible. In chapter II, the author describes the method of preparation and final purification of insulin for therapeutic purposes. In the next chapter the author describes in detail the effect of insulin on depancreatized dogs, giving experimental data as to how insulin affects the glycogen content of the liver and heart, its behaviour on the respiratory quotient in depancreatized animals, glucose utilization per unit of insulin, etc.

In chapter IV, the author goes on to describe the effect of insulin on normal and hyperglycemic animals. He then describes the symptoms of experimental hypoglycemia in animals.

In chapter VI, the author deals with the physiological assay of insulin, discussing the various methods used for the purpose, and finally giving a method of assay used at present by the Insulin Committee of the University of Toronto, which, according to the author, can still be improved upon.

In chapter VII, the author describes the ultimate fate of depancreatized dogs treated with insulin.

From chapter VIII, begin the clinical experiments with insulin. All clinicians, specialists or general practitioners will, we are sure, derive benefit from the perusal of these chapters. The author strongly condemns the "luxury use" of insulin in cases where it is not indicated, but is given only "to satisfy a gluttonous appetite or to avoid the necessity of dieting." He remarks that such a method of treatment only "reveals a lack of intelligent foresight as well as a lack of resourcefulness on the part of the physician in the treatment of his patient."

The subjects of simple ketosis, acidosis and coma are dealt with in an able manner and a résumé of treatment in these conditions is given.

The dietetic treatment of diabetes is very ably discussed by the author and the scientific method of prescribing a diet for a diabetic patient according to his basal caloric requirement, obtained from Du Bois' table, in accordance to the height and weight of the patient is described. In chapters XIV and XV, the insulin treatment of diabetes is described in detail and one may profit considerably from the perusal of these chapters.

In the last chapter the authors have given a few very useful recipes for a diabetic diet and a table of food equivalents which will be extremely valuable in the selection of a suitable diet for a given diabetic individual.

J. P. B.

TUBERCULOSIS OR CONSUMPTION; WHAT YOU SHOULD KNOW ABOUT IT.—By Dr. G. Ghosh, M.B., B.S., D.T.M., formerly Assistant Director of Malarology, U. P., Allahabad. Pamphlet of 6 pp. Price, 1 Anna.

THIS small pamphlet is entitled "Health in the Tropics Series, No. 1." It details in very simple language the symptoms which should arouse suspicion of tuberculosis and gives simple instructions to be followed by the patient. It is intended, we presume, for wholesale distribution to the lay public. The information in it is accurate and well expressed.

BATS, MOSQUITOES AND DOLLARS.—By Charles A. R. Campbell, M.D. Boston, Massachusetts: The Stratford Co., 1925. Pp. 262.

THE author of this work states that he was formerly bacteriologist to the city of San Antonio, Texas, and limits his private practice to malaria and typhoid, so one would naturally expect him to have a scientist's appreciation of the value of experimentally gained evidence, and an expert's knowledge of the disease with the eradication of which this book is mainly concerned,

but one discovers with amazement that the evidence for the alleged culicivorous habits of bats is apparently founded on the dissection (by another worker) of one specimen of a single species of bat, *Nyctinomus mexicanus*, and on that one is asked to blindly accept the unsupported statement "what has been learned of this species applies to all others of the small varieties." (The author, by the way, uses "variety" as synonymous with "species," throughout.) That the bat with which the author worked was not mainly a mosquito-eater is only too clearly proved from the top figure on the plate facing p. 84, bearing the caption "Bat guano (chitin); showing skeletal remains of insects, principally mosquitoes," where the remains figured appear to be, in so far as they are recognizable, almost entirely coleopterous, and there are abundant admissions scattered throughout the paper that the admittedly insectivorous bat is not entirely a mosquito-eater. But the author would go further than that; on p. 85 he states that they have a selective instinct for finding engorged mosquitoes, whilst on p. 249 we find the literally astounding suggestion that "it is this parasite-laden blood, with its concomitant toxins, which she (Nature) causes to be wholesome to the bat," and the reviewer thinks he does not do the author an injustice in reading into the relative sentences the further suggestion that the bat specially selects infected mosquitoes!

We searched diligently to find on what evidence these assertions were made, only to finally encounter the remark, "these astounding statements are not founded on the experiments, statements or observations of any person, but on the solid and immovable foundations of science!"

After this, we are hardly surprised to find that the author's clinical knowledge of malaria is hardly greater than his conception of the life-cycle of the causative parasites. His plate opposite p. 20 of the cycle would appear, judging from the figures of the sexual forms, to purport to be that of malignant tertian (though most of the figures are so inaccurate as to be meaningless), but his description, obviously meant to harrow the imagination and wake the reader up to the seriousness of the disease, is of an attack so mild that the sufferer must "drive himself to work," and during the rigor stage take two or three drinks, "which will restore his feeling to the false normal." This, apparently, is the type of malaria the author claims to have eradicated from the San Antonio district.

Among other gems culled from six pages of notes made whilst reading the book for review, we learn that for diagnosis of the disease, observation is better than "the most unsatisfactory of diagnostic methods, the microscopic," and that "the microscope is a most unsatisfactory instrument to depend upon"; that Laveran, whose name, by the way, is misspelt, discovered the mosquito cycle of malaria; that phagocytosis is controlled by the brain; that blood "coagulates in plain water"; that the body hairs of the bat have an auditory function; that 6½ tons of liquid blood is obtained annually from the 1,61,379 citizens of San Antonio by mosquitoes (the reasoning of this calculation, on pp. 249-251, is pure joy); that "no particular training or specializing in any branch of science" is required to understand the biology of dragon-flies so fully that they can be bred artificially in large numbers; that the bed bug can jump; and that its "bacterial flora is both varied and interesting" (here we leave the author to the comments of the kala-azar workers); and that it is conclusively proved that this insect is alone responsible for the spread of small-pox.

The author (city bacteriologist, be it remembered), is an admitted anti-vaccinationist, and has apparently not hesitated not only to try and spread the disease by fomites of all kinds, but actually allowed segregated contacts out to mingle with the population of the city that paid him as its bacteriologist. Yet the author's brethren of the local medical association apparently not only listened to his two papers on small-pox—here reproduced—with unanimous approval, but (in connec-

tion with bats) recommended him for the Noble prize!!

Whilst it is extremely probable that the author really has found out one thing, how to hive bats artificially, this is precisely the piece of information details of which are conspicuous by their absence.

Of Dr. Waddell, D.E., LL.D., who is thanked by Dr. Campbell for polishing the diction, and yet who passes "batophile" as a compound noun, and the spellings "gamets" and "sporolating," all we can remark is though he may be an "eminent American consulting engineer," he is emphatically not a master of the English language.

The mentality of a medical man who can produce a work so full of misstatements, inaccuracies and unproved assertions as this book, with its constant references to publicity, was incomprehensible until we recollected Dr. Almus Pickerbaugh in "Martin Arrowsmith." No one who has not first soaked himself in American medical mentality as portrayed in that saga of research will properly appreciate "Bats, Mosquitoes and Dollars."

R. S. W.

RECENT ADVANCES IN OBSTETRICS AND GYNÆCOLOGY.—By Aleck W. Bourne, B.A., M.B., B.Ch. (Camb.), F.R.C.S. (Eng.). London: J. & A. Churchill, 1926. Pp. 344, with 58 illustrations. Price, 12s. 6d. net.

THIS is a most excellent book of 344 pages which should be in the hands of every practitioner and especially every teacher of obstetrics and gynecology in India, and Dr. Bourne is to be congratulated on a fair and well-balanced exposition of a subject which is growing so rapidly; for it is almost impossible for the busy practitioner to keep in touch with the all round advances in every branch of medicine without some books such as this to feed him. The book begins with a clear exposition of the present views on ante-natal care, and proceeds to a discussion of the means and methods of prevention and prophylaxis. He demonstrates, from the point of view of prognosis, the unreliability of renal, blood, and hepatic tests in the so-called toxæmias of pregnancy, and the research findings of a large number of reliable chemists are given in detail; however, the following conclusions from the point of view of diagnosis are important, namely, that in a pregnancy kidney the blood urea is usually under 50 mg. and the urea concentration test above 2 per cent., but in chronic nephritis with pregnancy the blood urea is 70 mg. or over, and the urea concentration test below 2 per cent.

The chapter on ante-partum hæmorrhage is concise and lays great stress on the advantages of proper vaginal plugging, and recent work in America confirms these views; for deep laceration of the cervix, during or after bag treatment, or version is a frequent cause of hæmorrhage and sepsis.

From the point of view of the practitioner, quite the best chapters in the book are those dealing with eclampsia and puerperal sepsis. All the recent work and findings are tabulated seriatim and great assistance will be found from the detailed report of the Stroganoff methods; there is no question that this one chapter will well repay any practitioner the small cost of this book. Similarly, one cannot do better than advise that all practitioners should study the very able chapter on puerperal sepsis. Dr. Bourne reviews all the recent work on cancer, and sterility; and the uses of x-rays, radium and diathermy are reviewed by specialists in these techniques.

In a book so well written and put together it is perhaps invidious to make criticisms, but we would suggest that in any future edition hyperemesis gravidarum, with the recent research work on this subject and treatment be recited, and that the low cervical Cæsarean operation by Dr. de Lee be given notice; for there is no question that this operation is far less dangerous and gives far better results than the old method described in the book for dealing with potentially septic cases where Cæsarean section is indicated or

CÆSAREAN SECTION, WITH A TABLE OF 120 CASES.—By Herbert R. Spencer, M.D., B.S., F.R.C.P. London: John Bale, Sons & Danielsson, Ltd., 1925. Pp. 71. Price, 6s. net.

THIS admirable book of 71 pages is a brochure of the personal results and findings of the author, and is compiled with that astounding and meticulous care that always graces the work of Dr. Spencer.

The first chapter is purely historical and extraordinarily interesting, so much so that one feels inclined to paraphrase the gentle remark of Cleopatra "How happy the horse that bears the weight of Antony!"

Dr. Spencer ably demonstrates that Cæsaræan section is being performed too frequently by many operators. He states that in a period of 33 years some 75,000 labour cases passed through his hands indirectly in the University College Hospital, Maternity Department. Out of this number he was solely responsible for 120 Cæsaræan sections; 47 of these patients were primiparæ and 13 had contracted pelvis; 42 of the 73 multiparæ had had dead children, delivered usually by craniotomy or forceps, in previous labours; 29 had had previous Cæsaræan sections. His total maternal mortality was 3.3 per cent. and total infantile mortality was 10 per cent.

Dr. Spencer always uses silk for the uterine scar and is greatly adverse to any form of sterilization of the patient after the operation. His method of anaesthesia is of importance and easy of application in India. Morphia is never given beforehand; the patient is given chloroform until the child has been removed, then open ether is given. No mention is made by Dr. Spencer of his ever having tried the low cervical incision of Dr. de Lee which has been published now for over 10 years as a means of dealing particularly with potentially septic cases. The technique of his operation is given in detail, but one would have wished that the author had mentioned whether he brings the apron of the great omentum down over the front of the uterus before closing the abdominal wound, or whether he prefers tucking it under and behind the uterus; as the question of adhesions or possible intestinal symptoms may be dependent on the technique followed. This is indeed a fitting monument to an almost unique record of service (33 years) on the staff of a great London hospital. *Si monumentum requiris, circumspice.*

PUERPERAL SEPTICÆMIA.—By George Geddes, M.D., C.M. (Aber.). Bristol: John, Wright & Sons, 1926. Pp. 200. Price, 12s. 6d. net.

DR. GEDDES presents the above admirable thesis based upon the fact that puerperal fever occurs more frequently in the practice of medical practitioners in Great Britain than in the practice of certified midwives, and one must confess that he has proved his case in this book. Puerperal fever, unfortunately, does not seem to get any less in its incidence, and it would appear that while the majority of general practitioners who attend confinement cases, also are attending industrial accidents with wounds, superficial and deep, teeming with pathogenic organisms that, with the growth of industrialism the incidence of puerperal fever will increase rather than diminish. His statistics and tables undoubtedly prove that urban industrial areas have a considerably higher puerperal fever rate than country areas, and that, in urban districts on the other hand where certified midwives do the majority of confinement cases the morbidity rate is less than in those where doctors attend. His argument is confirmed by an immense statistical report from the largest industrial areas of the Midlands and therefore there seems no doubt that industrial accidents, which are tended by doctors who in the course of their ordinary routine are attending a large number of confinement cases in these areas, *ipso facto* determine a high puerperal fever rate. The corollary of his proved argument is that in order to lessen puerperal fever, public opinion or the State should provide or insist that maternity cases should be attended by practitioners who are not doing general industrial practice, or by midwives who are

closely supervised, and who cannot, and shall not, attend the septic wounds of anybody before or during the time they are on a maternity case. This book of 200 pages will well repay study by all teachers and reformers.

RATIONAL GLAND THERAPY FOR WOMEN.—By I. Wanless Dickson, M.B., F.R.C.S. London: H. K. Lewis & Co., 1926. Pp. 96. Price, 4s. 6d. net.

THIS is a book of 96 pages, with a good bibliography. The author has set down his own close observations of the many phases of menstrual life in women. It would seem that he is a confirmed optimist and fervent believer in the effect of the whole panjandrum of endocrine glands for every slight deviation from the normal during menstruation. If one would believe Dr. Dickson, there is no such thing as normality in the purely physiological function of menstruation. Every tiny symptom or aberration can, or should be treated, according to the author, by some one or other combination of the ductless gland products. How he correlates his observations with those of Murray and Swale Vincent who are confirmed pessimists, except as regards thyroid, parathyroid and pituitary medication, it is difficult to see; for there are a host of authorities to-day who deprecate on scientific principles 'shot-gun-like' tablet prescriptions of inert substances.

Dr. Dickson gives chapter and verse for his findings, and certainly the book sounds a note of conviction, but is it not possible that many of his astounding results are the effect of suggestion or the personal equation?

PRACTICAL MICROSCOPY. AN INTRODUCTION TO MICROSCOPICAL METHODS.—By F. Shillington Scales, M.A., M.D., B.Ch. (Cantab.). Third Edition. London: Baillière, Tindall & Cox, 1926. Pp. 332, with 119 plates. Price, 8s. 6d. net.

THIS is an admirable little book. The author was formerly lecturer in microscopy, Westminster Hospital, and honorary secretary to the Royal Microscopical Society. Thus he knows what students need to know and how to teach them. The percentage of medical men in India who use microscopes is still far too low, but we are glad to note of recent years that it is steadily increasing. But, almost without exception, the medical student is taught next to nothing about the microscope and its accessories which he is so constantly called upon to use. Even among trained bacteriologists and research workers the number who know how to use a microscope intelligently is very low. Yet the understanding of the elementary principles of optics and a short course of reading, such as this book provides, will help the laboratory worker to vastly improved results.

Throughout the book the author has been careful to keep his teaching elementary. Works on practical microscopy are apt to be either very bulky and expensive, —in which case the worker who needs information has to undertake a veritable treasure hunt before he finds what he wants; or else too scanty and too popular in style to be worth anything. The medical laboratory worker in the tropics is not interested in diatoms as studied with the 1/6th inch dry objective; but he simply *must* understand how to use and take care of an oil immersion lens. He needs to know how big a difference tube length makes to accurate observation, and the value of a centering sub-stage condenser. Instruction in micro-photography he requires, and if he cannot cut a section of less than 5 μ in thickness and stain and mount it properly, he has much to learn. It is peculiarly true of laboratory work in tropical medicine that everything depends upon technique; one student will make a blue smudge of a blood film when staining it by Leishman's stain and find nothing; another will get a nearly perfect result and identify the accolé ring forms of *Plasmodium falciparum*. No medical man can practise tropical medicine, as it should be practised, unless his microscope is his daily companion and

friend. And it is far better for him to learn how to use this instrument properly than to use it unintelligently. Hence the particular value of such a book as this, with simple, accurate and easily intelligible and accessible information.

The successive matters dealt with are the simple and compound microscope, the choice of a microscope, objectives and eyepieces, accessories, the practical optics of the microscope, manipulation of the microscope and its accessories, photo-micrography, microscopical technique, preparation and mounting, section-cutting, and staining. An appendix gives a very useful bibliography, and tables and formulæ. Finally, the work is well indexed.

We are particularly glad to note the emphasis which the author lays upon the claim of British-made microscopes. The idea that German microscopes are better than British is a myth, whilst some other continental models would be best relegated to the scrap heap. (For some years we have had painful experience of a student's model of continental manufacture in which the milled heads for the mechanical stage have to be worked by both right and left hands as they are on opposite sides of the stage, thus using up both hands and not leaving one free for the fine adjustment.) Beck's, Watson's, Baker's and Swift's models are all sound and reliable workmanship. The German microscopes of to-day are very attractive models, but the reviewer's experience of the past seven years has been that they do not wear as well as did the pre-war models. That they are very good, goes without saying; that they are better than present-day British models is not the case.

There are one or two points in which the book is perhaps a little lacking. The reviewer has for the past four years now adopted for routine use a binocular microscope and generally uses one of the new "fluorite" $1\frac{1}{7}$ th inch oil immersion lenses with a No. 4 or No. 10 pair of "periplanat" oculars; and he considers that these new "fluorite" lenses might have been commented on. They keep well in the tropics,—which cannot be said for all apochromats. They give very good definition, a considerable working distance, and one can cover ground rapidly in examining a blood film or an emulsion of faeces. These lenses mark a definite advance in microscopy; they are especially suitable for students, and almost any desired magnification can be obtained by using high power oculars. For critical work a $1\frac{1}{12}$ th inch or $1\frac{1}{16}$ th inch apochromat is essential, and in this connection the author might have added comments upon the use in general of artificial light,—although he has described the general types of lamps in use, he has hardly commented upon artificial light versus sunlight; even in the tropics, the reviewer's experience is that a good electric lamp is better than sunlight. Schaudinn's fixative should surely deserve honourable mention, whereas it is omitted; and we were amazed to find Leishman's stain for blood films omitted; surely it is the stain most universally used for blood films in the tropics, but its making up and use require most careful manipulation, and Jenner's is in no way a substitute for it. Giemsa's stain is also omitted.

Apart from such minor defects—and after all the book is one upon microscopy and not upon staining methods—the whole volume is one which the medical student should read and study—though he probably will not; which will be exceedingly valuable to the laboratory worker; and which meets a long-felt want, the need for a handy book of reference which is neither so voluminous that one becomes lost in its pages, nor so scrappy that it omits the information which one is in search of.

R. K.

PHYSIOTHERAPY: THEORY AND CLINICAL APPLICATION.—By H. E. Stewart, M.D., Paul B. Hoeber, Inc.: New York. Pp. 351. Price, \$7.50 net.

In this volume the author confines himself to the consideration of the physical methods which seem to be of proven value in the treatment of disease. He "does

not consider physiotherapy as an end in itself but he feels rather that it is an invaluable adjunct to other methods of treatment." This attitude, the correctness of which is self-evident, colours the discussions throughout the book.

This work which covers the whole range of physiotherapy is divided into two parts. Part I deals with the various physical agents employed—electricity, phototherapy, actino-therapy, thermo-therapy, massage, exercise and hydro-therapy, giving the general technique employed in each case.

Part II discusses the clinical application of the various modalities to systemic and local diseases.

Out of a large number of treatises of this nature which have come to our notice there is none to compare with this for lucidity, brevity, and the ground covered. It is full of practical hints and moreover is written in a clear and easy style and with the full consciousness that physiotherapy is not, as some authors try to prove, a panacea for all ills.

The author is to be congratulated on having produced a book of real value to the physician, surgeon and student of medicine.

ULTRA-VIOLET RADIATION AND ACTINO-THERAPY.—By Eleanor H. Russell, M.D., B.S., and W. Kerr Russell, M.D., B.S., with forewords by Sir Oliver Lodge, F.R.S., and Sydney Walton, M.A. Edinburgh: E. & S. Livingstone, 1925. Pp. 268, with 77 illustrations. Price, Rs. 7-14 net. Obtainable in India from Messrs. Butterworth & Co. (India), Ltd., Post Box 251, Calcutta.

THIS little book, written in a charming literary style, is an exposition of our knowledge of radiation in general and the application to medicine of the rays of that part of the spectrum known as the ultra-violet region.

In his foreword Sir Oliver Lodge says it is a book dealing with a comparatively new and highly promising subject by people with medical training, physical knowledge, and extensive and rapidly growing experience, and therefore should be welcome.

The earlier chapters are devoted to physical and chemical considerations. Then follows a chapter on technique. The remaining chapters are concerned with the application of this agency to medicine. The book is profusely illustrated, practically every known type of arc or lamp being figured.

Perhaps the most fascinating parts are those dealing with the biological effects of the rays. Numerous experiments are quoted showing the remote effects of an agency acting on the skin.

This little volume should prove acceptable to the layman interested in the advance of medicine, to the physiologist, physician, surgeon, and most of all to the dermatologist as it fills up the therapeutic gap between light treatment and x-rays.

AN INTERMEDIATE TEXT-BOOK OF PHYSIOLOGICAL CHEMISTRY.—By C. J. V. Pettibone, Ph.D. Third Edition. St. Louis: The C. V. Mosby Co., 1925. Pp. 404. Price, \$3.25.

THIS is a good handbook on theoretical and practical physiological chemistry, intended for students going up for higher studies in the subject. The theoretical portion of the book has been written in an excellent style and the author has clearly and comprehensively dealt with the fundamental processes going on in the human body, avoiding lengthy discussions on debated points which are often confusing to students. The chapter on physiological chemistry in its relation to physiological chemistry is very well written and will amply repay perusal.

The chapter on metabolism of carbohydrates, proteins and fat has been written with all necessary details within the brief space of 42 pages. In discussing the problem of the minimum amount of protein required per day by a healthy normal individual the author does not support either Chittenden's low estimate of 40 grammes a day or Voit's high figure of 120 grammes, but

recommends a compromise of 90 grammes, which is in accordance with the views of many of the present-day authorities who have fixed the minimum protein intake to be from $\frac{1}{2}$ gramme to 1 gramme of protein per kilo of body weight.

We would have liked to see the practical portion of the book dealing with the micro-chemical methods of blood analysis made a little more elaborate. The author does not lay stress on any of the many alternative methods of analysis of the various constituents of blood, such as non-protein nitrogen, sugar, urea, uric acid, creatinine, etc. So many new methods have come forward lately that the description of one or more of the more important ones would have certainly enhanced the value of the book.

However, we have no hesitation to say that the book is a first class laboratory guide to students of bio-chemistry and we heartily recommend it as such.

J. P. B.

INDIAN HYGIENE AND PUBLIC HEALTH.—By Lieut.-Col. C. L. Dunn, D.P.H., I.M.S., and Rai Bahadur D. D. Pandya, D.P.H.

WITH reference to the review of this book by "A. B. F." in our issue for last April, p. 194, we have received a protest against the severity of the review from Messrs. Butterworth and Co., the publishers. As we always try to have special books reviewed by leading authorities on the subjects in question, the book was sent to a distinguished public health expert for review. As his comment was unfavourable, we asked him to append his initials, which he kindly did. Messrs. Butterworth point out that the whole aim of the book was to provide Indian students with a book which was both reliable and cheap. A book of 679 pp. with 83 illustrations, published at Rs. 12, is certainly very good value. The book represents an honest effort to give the Indian student both what he needs, and what he can afford. Had the publishers stated that their main object was cheapness, our reviewer would have been more lenient.—EDITOR, *I. M. G.*

Annual Reports.

DISPENSARY RETURNS OF THE PROVINCE OF ASSAM FOR THE YEAR 1924. BY COLONEL H. INNES, I.M.S., OFFG. I. G. C. H., ASSAM. SHILLONG, ASSAM GOVT. PRESS. 1926; PRICE RE. 1.

THIS report does not call for extensive review, as the information in it is chiefly statistical. Colonel C. H. Bensley, C.I.E., I.M.S., held charge of the Medical Department during the year. The year closed with 230 hospitals and dispensaries of all classes in working order, and in all 1,578,972 patients—both in-patients and out-patients—were treated during the year; a slight decrease on the figures for 1923. In Sylhet there was an increase of 20,145 patients treated during the year, due partly to the opening of a new dispensary at Birhimpur, the prevalence of cholera at one period, and the increasing popularity of the dispensaries.

Malaria heads the list of diseases for which relief was sought, and cholera was important during the year—the cases treated numbering 5,105 as compared with 771 in the previous year. Other diseases which contributed an increased number of patients were kala-azar, dysentery, venereal diseases, enteric fevers and leprosy. Male patients treated were far in excess of female patients, in the proportion of about 100 males to every 22 females. Surgical operations totalled 17,263, and selected operations 1,122. The total income was Rs. 7,81,190, of which Government contributed Rs. 3,28,969, and the total expenditure Rs. 6,15,765. It is clear that financial conditions are improving in the province, with—as a natural corollary—increasing and improved medical relief.

ANNUAL REPORT ON THE JAIPUR MEDICAL AND METEOROLOGICAL INSTITUTIONS FOR 1924.

THE most striking point about the meteorological observations during the year was the excessive rainfall; at the Jaipur observatory this was recorded as 50.54" as against a normal of 24.14" and the average rainfall throughout the State was 39.03" or 16.15" above the normal.

In Jaipur City the births showed a decrease since the previous year and the deaths an increase. More than half the deaths occurred in children under the age of 5 years. The greatest number of deaths were recorded under 'fever'; this accounted for nearly half the total deaths.

Epidemics.—Small-pox occurred in epidemic form in the first five months of the year. This disease accounted for 387 deaths during the year; this is by far the highest figure recorded for a number of years. Four deaths occurred amongst vaccinated persons and 383 amongst the non-vaccinated. Malaria only occurred in a very mild form and one death from cholera was reported. Eleven imported cases of plague were reported. There was no influenza during the year.

The general health of the population of the city and its suburbs appears to have been above the average. Tuberculosis is still on the increase. The infantile and maternal mortality appears to be a matter that is attracting public interest; some improvement may be expected if the various Baby Welfare schemes are carried out efficiently. It would appear that sanitation in the city is of the most primitive nature. The amount of night-soil and rubbish removed was 79,642 wagon-loads at the cost of a little under one rupee per wagon-load. One interesting item that is included under sanitation shows that 6,680 cubic feet of fresh sand was supplied for the tigers' cages in the city.

Fifty-two mad dogs were captured in the city and sent to jungles far away from the city. (This appears to be a measure which is more satisfactory from the point of view of the inhabitant of the city than for the cultivator who may happen to live anywhere near these distant jungles; surely if religious scruples prevent the destruction of these dogs they might be kept in captivity for the very few days which the rabid dog is allowed by Nature.)

Primary vaccinations were reported as 53,562 during the year and successful revaccinations as 869. Lymph was obtained from the Government depot at Lahore.

The attendance at medical institutions during the year, excluding the jails and lunatic asylum, was 2,63,232; of these 5,178 were in-patients and the remainder out-patients. 16,804 operations were performed.

The report of the Mayo Hospital shows that a very large percentage of the medical work of the State is carried out here; 42,811 out-patients and 3,540 in-patients were treated during the year. Altogether 4,214 operations were performed. A detailed analysis of the operations is given, amongst them the operation of litholapaxy is reported as having been performed 54 times; the largest stone crushed weighed 1,065 grains.

The report of the pathological department shows that 751 examinations were carried out.

Fifty-one cases of leprosy of both the anæsthetic and nodular type were treated with a leprosy vaccine prepared at the Haffkine Institute, Bombay; in most cases improvement was reported.

THE UNION MISSION TUBERCULOSIS SANATORIUM, MADANAPALLE, S. INDIA. SURVEY OF THE WORK FROM 1915-1925; AND ANNUAL REPORT FOR THE YEAR 1924-25. BY C. FRIMODT-MOLLER, M.B., B.Ch.

WE have from time to time in our columns commented upon the admirable work done by this institution, and it is pleasant to peruse the connected narrative, well illustrated and of considerable interest, recorded in this

report. The sanatorium was established in 1913 by the joint efforts of seven co-operating missions and government, half the cost being found from each source.

It is situated at Arogyavaram near Madanapalle in S. India at an elevation of 2,500 feet, close to the borders of Mysore State, and in an atmosphere entirely free from dust and dirt. The climate ranges between 70° to 80°F. in the cold weather, and 95° to 102°F. during the hot weather. There is a small annual rainfall—28 inches—which is distributed fairly evenly throughout the year; the hills around giving the site protection from heavy monsoon storms. Conditions are therefore very good for such a sanatorium.

Intense dry heat, notes Dr. Frimodt-Møller, is very detrimental to tuberculous patients; it is noted that patients put on weight better during the cold weather and when there is a slight degree of humidity, than in the hot dry months of March and April. The greatest percentage of patients allowed out of bed is during the months of December and January. It is important to note that certain facts must be borne in mind in selecting a site for a tuberculosis sanatorium in India. The plains are impossible. Further, sites where there is a heavy monsoon rainfall are bad. Too high an altitude may also be bad, as in the intense cold of winter in the Himalayas such sanatoria may have to be closed down.

The daily average number of patients in 1915 was 69.4; in 1925 it was 136.2, with 142 beds available. In spite of this there is a long waiting list. The special wards of pucca construction, airy, and giving privacy are especially in demand. Patients come not merely from Madras, but from Bombay, Calcutta and even Singapore, Assam and Rajputana. Every race and caste almost in India is represented, and every profession from government officials, merchants and zemindars to street beggars; 20 per cent. of the patients in the general wards are free. The extension of the sanatorium has been such that there are now over 80 pucca buildings scattered over an area of 100 acres. "We have gradually fought our way forward in the matter of hygienic improvements, the chief of which is the construction of sanitary buildings, during the last ten years" writes Dr. Frimodt-Møller. The water-supply, at first taken from a local well, was unsatisfactory; and an entirely new system has been installed, water being brought from half a mile away by pumps. In addition to the 100 acres covered by buildings, a further 130 acres of deforested land has been made over by government, and pathways have been laid out to give the patients the graded walks which constitute so essential a part of the treatment.

Many persons are accustomed to think of a tuberculosis sanatorium as being merely a place where patients are in the open air, and that provided open air conditions can be obtained, nothing else is necessary. This is quite wrong, writes Dr. Frimodt-Møller; the principle of treatment is special treatment carried out in the open air, which is quite a different thing. Constant daily changing rest and graded exercises are the fundamental principle of treatment, and every patient demands individual study and attention. Freedom from mental worry is also an essential factor in treatment, and friends and relatives are only too often the enemy of the consumptive.

Turning to different special lines of treatment which have been tried during the last ten years, tuberculin has been tried in over 350 cases. It must be given under full skilled supervision and care; used indiscriminately, in too large doses, and without attention to the proper intervals, it may do no end of harm. Used intelligently, however, and with a study of each individual concerned, it is of special value in afebrile cases, helping to clear the sputum of tubercle bacilli.

Artificial pneumothorax, however, Dr. Frimodt-Møller places first of all as the most efficient line of treatment yet discovered for pulmonary tuberculosis since the discovery of sanatorium treatment. It can only be given under certain circumstances and only to selected cases, but it is of special value in Indian

practice. The Indian patient is one who arrives for treatment usually at a late stage of the disease; artificial pneumothorax gives complete rest to the affected lung in a way which no other measure does; and the results are good. During the last five years 170 cases have been so treated, all of them advanced cases in stage III. Excluding seven cases who died or left the hospital within a month, and 49 in which it proved to be impossible to induce pneumothorax on account of adhesions, and 22 who are still under treatment, the results in the remaining 92 cases are reported. Of these 28 were discharged as arrested, much improved or improved. Further, it is the best line of treatment for such advanced cases as are suitable for it.

Autogenous vaccines are of value in some cases, helping to clear secondary infections and to limit the disease to an infection with the tubercle bacillus alone. Dreyer's vaccine was tried on 55 patients, all advanced cases. It proved to be of value only in non-reactive cases in which fibrosis has commenced. Sanocrysin treatment has been tried recently, and the results with this were reviewed in our columns lately—(*vide I.M.G.*, April 1926, p. 187). It is very useful in carefully selected cases, and the patients so selected are often able to go for walks after having been bed-ridden for months; on the other hand tubercle bacilli still remain in their sputa.

As is now coming to light in connection with almost every tropical disease, secondary complications are of great importance. It is not enough to recognise that a patient has pulmonary tuberculosis; he may have in addition a heavy ankylostome infestation, relapsing malaria, or syphilis. The treatment of these secondary infections may be of great value in building up the patient's strength to resist the tuberculous infection.

The laboratory is under the charge of the Rev. R. M. Barton, M.A., who had a special three years training in the subject during the war. It has recently expanded to an enormous extent. Not only is there systematic examination of the sputa of all patients, but examination of the faeces for helminthic ova and protozoa, of the urine generally—especially in connection with the sanocrysin treatment,—of thin and thick blood films for malarial parasites, and many miscellaneous examinations are called for. The total laboratory work recorded in 1924-25 involved over 7,000 laboratory examinations.

An X-ray Department was installed in 1925; half the funds having been found by missionary effort and half by government. It is an absolute necessity in such a sanatorium.

With regard to length of stay of patients in hospital, it may be said that in early cases from four to six months is necessary. Advanced cases may require a period of a year or more.

The results of treatment are to be assessed both with regard to the immediate results at the time of discharge of the patient, and also as to his condition in later life years after he has left the Sanatorium. In all during the ten years under review, 1,487 patients have been discharged who had been more than one month in the Sanatorium and who had been proved to be tuberculous patients. A "positive" result—i.e., arrested, much improved, or improved—was obtained in 72.2 per cent. of these cases. Of 369 patients in stage I, 98.6 per cent. obtained positive results; of 551 in stage II, 82.2 per cent.; of 567 in stage III only 45.5 per cent. Some 71 per cent. of patients in stage I, can be arrested; but only some 1.5 per cent. of cases in stage III.

If we turn to European and American figures we find that some 75 per cent. of 10,000 patients treated by the public health authorities in London in the early stage were found to be alive five years later; and 50 per cent. of moderately advanced cases. Early treatment is the one great cardinal factor making for success. In India, as we have repeatedly pointed out in our columns, conditions are totally different; the Indian patient arrives at hospital as a last resort and usually in an advanced condition of disease; further, tuberculosis in an Asiatic race is entirely different from the same disease in the

European; it is too often an acute, almost fulminating infection. There is no early immunising infection with bovine tuberculosis from the milk supply in childhood; the majority of infections are with the human strain. The infection is one on virgin soil; the patient frequently under-nourished and in circumstances of economic depression; too frequently also an inhabitant of a crowded *busti* or slum with but little access of fresh air and light.

Dr. Frimodt-Møller remarks on the difficulty in India of following up patients and in finding out their after-history. It is one of the greatest difficulties in the practice of medicine in India. Every Director of a Pasteur Institute in India knows how difficult it is. Reply-paid postcards may be either neglected, or may induce such a state of terror in the recipient that he imagines that he has again become the subject of the disease; whilst if one invokes the aid of the police, the road is open to all sorts of abuses, and the information collected of very doubtful accuracy. Illiteracy, frequent transfers of the individual concerned, and other causes increase the difficulty. It is not surprising—it is rather a matter for congratulation—that 842 answers were obtained to 1,330 letters of enquiry. The remaining 36.6 per cent. of unknown results are about equally distributed between the three stages of the disease. These, of course, must be excluded from any calculation based upon the known figures.

Taking the figures up to the end of September 1924, in all 2,417 patients were admitted. Excluding those who proved not to be suffering from phthisis, or who left hospital after less than a month's treatment, a residue of 1,330 is left. On immediate discharge from hospital, the figures are as follows:—arrested, 37 per cent.; much improved, 23.7 per cent.; improved 16.4 per cent.; stationary or worse, 22.9 per cent. Five years later, some 31 to 54 per cent. of these patients are reported as alive and doing well, the majority of them as being in full work, 228 out of 807 patients traced proved to be at full work; whilst 186 had died of phthisis, and the results in 341 cases were unknown. In general it may be said that nearly all who survive five years after the completion of treatment are doing full work; the deaths occur chiefly during the first and second years after leaving the Sanatorium.

In general, although conditions in India are especially adverse to the tuberculous patient, yet there are certain factors in India which favour the convalescent consumptive. Chief among these in South India comes the abundance of fresh air and sunlight—even business deals in the market are carried out in the fresh air—and the relative absence of big towns with crowded slums. Dr. Frimodt-Møller's conclusions as to results of patients discharged five years previously are so interesting, and constitute so novel a contribution to Indian medicine, where the problem has hitherto practically been untouched, that we may quote them *in extenso*. They are as follows:—

(1) The condition of 807 patients discharged, five years after date of discharge in each case, shows that 54.5 per cent. were living and well, or at least 31.5 per cent. if we take into consideration the patients whose after-histories are unknown to us.

(2) The condition of patients discharged in relation to stages and immediate results on discharge, show that after five years, of those "arrested" in I stage about 86 per cent. (at least 54 per cent.) were alive and working, and in II stage 81 (54) per cent.; of those "much improved" in I stage 72 (43) were alive and working, in II stage 55 (29) and in III stage 35 (23) per cent.

(3) The condition of 1,330 patients discharged from 1915 to October 1, 1924, showed in 1925, 54.6 per cent. (at least 34.6 per cent.) living and working.

(4) Of the patients who died from tuberculosis after discharge, the 30 (19) per cent. died during the first year and 6.8 (4.3) during the second, while deaths from tuberculosis occurring after the sixth year are very few.

(5) The presence of tubercle bacilli in the sputum is in India of equal importance for the prognosis as in the West.

(6) The presence of fever, especially of high fever, during the treatment, is an equally serious prognostic symptom.

(7) The analyses of the after-histories of the patients show that sanatorium treatment in India is apparently of equal value to that in the West, and when Indian conditions are taken into consideration perhaps even of greater value.

Together with the great increase in the work of the Sanatorium, there has gone a necessary increase in the staff. Miss M. E. MacDonell, the first nursing superintendent, organised the nursing staff of the whole institution. Dr. Gravesen assisted in the work from 1921 to 1923, but has now been called upon to take charge of the Vejlebjerg Sanatorium in Denmark, one of the largest in Europe. Students, both male and female, and belonging to both missions and to government establishments, have received special training at the Sanatorium. The income at the end of the first ten years of working of the institution was Rs. 2,86,441 from Government sources, and Rs. 4,91,380 from mission sources,—the latter a specially notable figure. With a promised government grant of Rs. 85,000 towards a proposed capital expenditure of Rs. 1,70,000, it is hoped to extend the provision of beds from 141 to 200, together with the erection of quarters for new staff, kitchens and plant for electric light. Over Rs. 30,000 towards the Rs. 85,000 required has been collected by the Lee Memorial Mission, Calcutta.

The library, a Baby Cinema apparatus, and an annual fancy fair have been features of the social life of the community. Lord and Lady Willingdon paid a visit to the Sanatorium in 1924, and Lord and Lady Goschen in 1925; Lord Goschen remarks "I have been deeply impressed with all that I have seen in this admirable institution. It has done a wonderful pioneer work in this presidency against tuberculosis and I hope that the example may be copied, and further facilities afforded to patients in Madras, but the first honours will always remain with this Sanatorium and its organisers."

A special development of the institution during its first ten years was the creation of a tuberculosis colony. The question of after-care of tuberculous patients is a problem which is demanding a great deal of attention in both Europe and America to-day. Such patients are often not fitted for the strain and stress of ordinary every-day competition in the world. A beginning has been made at Madanapalle by the establishment of a small colony of eight patients, two or whom have their families with them. These live outside the main sanatorium but are still under medical supervision, their chief occupation being weaving. It is hoped that this movement will expand in future years.

In his concluding remarks, Dr. Frimodt-Møller states that sanatorium treatment has become the backbone of the campaign against tuberculosis in Western countries. His survey of ten years of sanatorium experience in India shows that the same remark is applicable to Indian conditions. Its value in India is even perhaps better than in Europe, since patients are taken out of a still more unfavourable environment into one which is perhaps even more favourable than in Europe. Sanatoria built to suit both the paying and the free patient may go far on the road towards self-support; the initial outlay of funds is the chief difficulty to be faced. After-results are poor with the class of Indian villager who goes back to unhygienic surroundings, but this can be avoided by the establishment of tuberculosis colonies for convalescent patients. The sanatorium movement is of the very greatest importance to India.

Turning to his review of the year 1924-25, which constitutes the concluding section of the report, 140 patients were in residence at the beginning of the year; the number admitted during the year was 217, and the number discharged 223. The daily average of patients was 136.5 as against an average of 128.4 for the previous

year. All races, castes, communities and professions were represented amongst the patients treated; 64 per cent. of patients treated came from the Madras presidency, but others from as far away as Burma, Ceylon and Rajputana. Of the 218 patients discharged, 157 are left for statistical analysis, the others having left before one month's treatment was completed, or others having been admitted in a moribund state or being non-tuberculous cases. No less than 53 per cent. of patients admitted were in stage III. Of these 157 patients, 112 or 71 per cent. were discharged as "positive"; i.e., arrested, much improved or improved. Of the cases arrested, those in stage I constituted 86 per cent.; those in stage II, 37 per cent.; those in stage III, only 20 per cent. The new English classification of patients into classes A, B, and C, with sub-divisions according to the amount of systemic disturbance involved has proved to be of greater value than the previous rough classification into stages I, II and III. On an average in 156 patients discharged as "positive" the average gain in weight was 12 lbs. Of 78 persons in whose sputa tubercle bacilli had been found on admission, in 22 no tubercle bacilli could be found on discharge from the Sanatorium. Of complications hæmoptysis, pleurisy, tuberculosis of the larynx, chronic bronchitis and tuberculous adenitis head the list. In the way of secondary complications helminthic infections, *Entamoeba histolytica* infection—whether acute or in the carrier state,—and malaria head the list. The general report speaks of the construction of new quarters for staff, and the opening of two new double special wards, and of the establishment of the x-ray section.

We fear that, despite the space which we have devoted to it, we have hardly done justice to Dr. Frimodt-Møller's most instructive and valuable report. This sanatorium represents the premier tuberculosis sanatorium in India; as far as we know it is the only one in which the sanatorium treatment of Indian patients upon a large scale is being attempted; or at least the only one to publish detailed reports. Its interest is very great, and the report is most ably put together. The value of artificially induced pneumothorax in the usual type of advanced case met with in India stands out prominently in the report; unfortunately it is a procedure only applicable where there are no pleural adhesions and then only to selected patients.

The whole report is full of interest, and it should be consulted in the original by all those interested in the tremendous problem of tuberculosis in India.

KASHMIR C. M. S. MISSION HOSPITAL AND KASHMIR STATE LEPER HOSPITAL. ANNUAL REPORTS FOR 1925. BY DR. E. F. NEVE, M.D., F.R.C.S.E., WESLEYAN MISSION PRESS: MYSORE, 1926.

THE annual reports of these two admirably run institutions are always attractive and interesting reading, being profusely illustrated with photographs. In the former the chief event chronicled is the recent death of His late Highness Sir Pratab Singh, Maharaja of Kashmir, and always a warm friend and supporter of the hospital. An account is then given of the two annual tours through the valley, which is very interesting; an instructive case is that of a man with a terrible wound of the face due to having been mauled by a bear. The entire nose had been torn off and there was insufficient tissue left to make a new one. A clay model nose was made and baked; and from it a wooden model prepared. This was fitted into the healed wound, with the result that the patient's appearance at a short distance was quite handsome. It must be rather trying to have to operate in an open courtyard with a large gallery of interested spectators on the adjoining roofs; but the villagers, says Dr. Neve, get very few famasas, and they do appreciate modern surgery.

In an account of "Past and Present" Dr. Neve pays a tribute to the many workers at the hospital whose

devoted labours have helped to create the present satisfactory state of its work. "Round the Hospital" is a fully illustrated account; there are two operating theatres, one for aseptic and one for septic cases; electrolytic chlorine, locally manufactured, is relied upon as the chief antiseptic.

Turning to the medical and surgical report for the year, the spring and summer epidemic of cholera was the chief feature of the year; some 22,000 cases occurred in the valley with a mortality of some 50 per cent. The population came forward readily for inoculation, and 2,655 persons were inoculated by the hospital staff. Srinagar itself got off lightly with only about 400 cases, partly owing to its excellent water-supply. Influenza and pulmonary tuberculosis are both serious matters in Kashmir. On the surgical side, there were over 1,100 eye operations, but 83 only were for cataract, which is far less prevalent in Kashmir than in the Punjab. Bone disease is very common, in the lower extremity alone there were 83 sequestrotomies during the year. Sixty cases of kangri-burn cancer were operated on during the year, and 93 of tuberculous glands,—the latter with usually excellent results. The injury cases met with are chiefly injuries inflicted by wild animals. Amputations (23) are chiefly for frost-bite or gangrene as the result of too tight bandaging by bone setters. A special feature of the work is the late state in which some of these patients are brought in; critical cases where the patient's condition constitutes a bad surgical risk but where operation is the only hope.

The income was Rs. 53,048, and the expenditure Rs. 52,858. The hospital has to find by fees from paying patients and voluntary contributions an annual sum of half a lakh, and Dr. Neve appeals strongly for financial support. The work of his hospital is so well known that we trust that his appeal will not fall on deaf ears. The Kashmir State gives annually only Rs. 4,000.

In connection with the Leper Hospital a notable advance was made during the year, the State having sanctioned a grant of Rs. 25,000 for the building of a home for the healthy children of lepers. This was completed in the summer and 12 such children were moved into the new home. There were 101 patients in the hospital at the beginning of the year, and 90 new cases were admitted during the year. Seven deaths occurred. Dr. Neve notes that with the gynocardate or ethyl esters treatment the greatest care has to be exercised where there are lesions of the eye or larynx, as any marked reaction may be dangerous to sight or life; in fact two of the deaths occurred from stenosis of the larynx in patients who refused to submit to tracheotomy.

RAJA SIR RAMASWAMY MUDALIAR'S LYING-IN HOSPITAL, MADRAS. ANNUAL CLINICAL REPORT FOR 1924. BY LIEUTENANT-COLONEL R. B. FOSTER, I.M.S. S. MURTHY & CO., MADRAS, 1925.

THE information contained in this report is—an usual—almost entirely in the form of statistical tables, difficult of analysis, and yet very interesting.

The number of patients dealt with during the year was in all 1,884, of whom obstetric cases numbered 1,847. Of the latter 1,161 were natural deliveries, and included 1,151 occipital presentations; difficult labours numbered 165, chiefly forceps cases and cases with labour lasting more than 24 hours; preterm deliveries numbered 57, including breech, foot, transverse and compound presentations, and complex cases numbered 464, including 24 of pleural births, 49 of hæmorrhage, 16 of eclampsia, 60 of inter-current infectious diseases, 40 of anæmia, and 92 of abortion. The monthly average of deliveries was 153 as against a figure of 145 for the previous year, and primipara constituted 24.6 per cent. of the patients; 94 of the patients were sent into hospital by midwives of the corporation child-welfare scheme.

Turning to obstetric operations, the chief indications for the application of forceps—80 cases only out of 243 obstetric operations—were difficult labour, contracted pelvis and eclampsia; 51 patients required repair of the perineum or cervix; in 48 cases of incomplete abortion and 2 of vesicular mole the uterus had to be evacuated; only twice was resort had to plugging of the cervix for placenta prævia, and only once to de Ribes' bag for the same condition. Laparotomy was required twice for tubal gestation.

Mahomedans numbered only 27 out of the 1,847 patients; Hindus, 1,068; Indian Christians, 298; and Adidravidas, 402. The ratio of percentage of deaths to the total number of patients treated was 1.72—or, if one excludes 26 out of 2,547 patients admitted in a moribund condition, only 0.70 per cent.; and 12 out of 44 deaths are attributed to severe ankylostomiasis infection. Live births constituted 91 per cent. of all children born. On taking the temperature reading twice daily from the second day after delivery till the end of the puerperium, only 147 patients showed a rise above 100°F., of whom 56 had such a temperature upon admission.

Of non-obstetrical cases, numbering in all 700, diseases of the generative system predominated, 298 cases; with diseases of the digestive system second, 90 cases, and malaria third, 88 cases. Of 19 cases of eclampsia which were treated during the year, 13 were primiparæ; 12 were delivered by natural means, and only 3 died.

Turning to the different classes of labour, natural labours come first. Of such cases there were 1,161 of which face and brow presentations numbered only 10; 16.5 per cent. were primiparæ with an average duration of labour of 12 hours. There were 95 cases of tedious labour lasting for more than 24 hours, of which 85 were of full term. Of laborious labour requiring intervention, there were 70 cases with a maternal mortality of nil and an infantile mortality of 4.28 per cent. Preterm labours numbered 57, of whom 32 breech presentation cases were delivered by natural powers. Complex labours, in which some accidental occurrence or disease involving danger to mother or child, or both, occurred, numbered 464. The chief complications encountered were hæmorrhage, ankylostomiasis, pleural births, and contracted pelvis. Triplets at a fourth pregnancy occurred, and 23 cases of twins.

Hæmorrhage may be classified into accidental—14 cases; placenta prævia, 10 cases; and post-partum, 25 cases, out of a total of 49 cases. Eclampsia occurred chiefly during labour, and more frequently after than before delivery—7 as against 3 cases out of a total of 19. Two cases of rupture of the uterus occurred, both ruptured before admission to hospital. Cases of contracted pelvis numbered 13; in 9 cases forceps was applied, in one Cæsarian section.

Abortions totalled 92 cases during the year; complete 41, incomplete 49, and vesicular mole 2 cases; 33 of such cases were in the first pregnancy. There were 88 deaths of children in hospital during the year, premature and immature infants numbering 42, 16 from infantile convulsions, and only 3 from syphilis. The produce of 1,775 labours was 1,780 children,—excluding 92 abortions, of whom 915 were males and 865 females.

Of obstetric operations evacuation of the uterus was called for in 50 instances with a maternal mortality of one patient; manual separation of the placenta after delivery in 8 cases; and 88 instances of application of forceps, with 2 deaths. The percentage of live births after forceps application was 91 per cent. Bipolar version was performed for 4 cases of complex labour, and podalic extraction for 11 cases, 7 of whom were breech presentations. Cæsarian section was called for in one case of complex labour and in one case of contracted pelvis; hysterectomy in one case of twins with complete rupture of the uterus; operation for ruptured ectopic gestation in two instances.

The training of I. M. P. pupils from the Madras Presidency at the hospital was continued during the

year, and 20 midwives paid for by the Madras corporation were passed out during the year.

HEALTH DEPARTMENT, CIVIL AND MILITARY STATION, BANGALORE. ADMINISTRATION REPORT FOR 1924-25. BY S. AMRITRAJ, M.B.E., L.R.C.P. & S., D.P.H., HEALTH OFFICER, BANGALORE. POWER PRESS: BANGALORE, 1925.

The general death rate of 31.94 per mille was the lowest recorded during the past eight years, whilst for the first time since its introduction in 1898 plague was practically non-existent in the station,—the 6 cases which occurred being either those of the previous year's season or imported cases. The birth rate was 39.39 per mille, and the infant mortality 274.6 per thousand births as against a corresponding figure of 306.9 for the previous year. The number of births reported from hospitals, private practitioners, trained nurses and municipal midwives is gradually rising each year, whilst those conducted by untrained *dais* is slowly going down,—a most satisfactory feature of the report. The excess of births over deaths was 886, a figure of 7.45 per mille of population.

Of the total of 3,799 deaths which occurred no less than 1,093 were due to pulmonary diseases; 574 were due to intestinal diseases; 429 were premature births, and 365 were due to constitutional diseases. The malaria mortality was insignificant, 47 deaths only; 718 cases, microscopically diagnosed as such, were treated as in-patients in the different hospitals, and 9,967 out-patients; in brief the anti-malarial measures of previous years are now shewing their effect. Malarial fever is very scarce in the station, and is a much more serious problem; it accounted for 325 deaths during the year; the incidence amongst females is more than double that amongst males, whilst the excess among Mahomedan women is especially notable.

Contagious and infectious diseases were unimportant during the year. There were 187 attacks and 38 deaths from small-pox which was rather prevalent in Madras Presidency during the year, but prompt steps were taken to check any outbreak. Anti-plague measures are being steadily carried on and although 4 cases were imported into the station no extension occurred. A small outbreak of cholera,—47 cases with 27 deaths—occurred in April 1924 in Shoolay and the Central Bazaar. Vigorous measures were taken, including the introduction for the first time in Bangalore of anti-cholera inoculation, and the outbreak did not spread. Anti-rabic treatment was given locally in the station to 51 persons, one of whom subsequently died of hydrophobia 13 days after completing treatment. Vigorous propaganda in connection with infant mortality is carried on and the attendance at lectures has been satisfactory. Conservancy on the whole is satisfactory; but strict attention has to be paid to food control; 28 persons were prosecuted for the sale of unwholesome food, but the fines inflicted only amounted to Rs. 27. The infliction of small fines is wholly inadequate for such offences; and of 1,368 cases tried in all for offences against public health laws the fines realised amounted only to Rs. 1,704. A fine of Re. 1 for failure to put up a private latrine makes it cheaper for the offender to repeat the offence rather than construct the latrine.

The old Bamboo Bazaar was removed to new quarters in Sultanji Gunta Road, and the former site cleared and made sanitary. The two municipal cattleyards at Fraser Town and Blackpally were in good order, and a new cattleyard was completed at New Paracherry. Anti-malarial measures were steadily carried on during the year, and the markets in general were kept in a clean and sanitary state. The annual Market Show was held on the 24th December 1924 and the exhibits all round were good, especially in the meat section. At the slaughter houses a total of 1,48,844 animals were slaughtered; amongst viscera condemned in this connection were 493 livers for tuberculosis—a surprisingly

large figure, which seems to indicate that bovine tuberculosis is not so uncommon in India as it was once imagined to be; 331 livers for hydatid disease, and 157 for liver flukes. The municipal laboratory carried out 5,175 examinations in its bacteriological section and 662 in its chemical section.

Public health propaganda work was steadily pushed during the year, and 42 lantern lectures and demonstrations given. A health and welfare exhibition was held from January 5th to January 11th, 1925, at the Rao Bahadur Arcot Narayanaswamy Mudaliar's High School. The following is an abstract from the opening address by Mr. W. P. Barton, C.S.I., C.I.E., British Resident:—

"Two years ago, in speaking at the opening of the Welfare Exhibition in Bangalore I emphasised the importance of improving the conditions of the slum population in Bangalore. The local authorities have made an effort to deal with the problem. Hundreds of model houses have been built for the depressed classes; special educational facilities are arranged; a beginning has been made in providing vocational education; funds have been liberally granted for welfare work and an efficient organization has been built up with the help of the Ladies' Committee; welfare centres with prenatal clinics and crèches have been opened and a staff of health visitors appointed. This organization, which is supervised and controlled by the Ladies' Committee, works in close co-operation with the Health Department, so ably administered by Dr. Amritraj. Yet with all this we have hardly got beyond the fringe of the problem. Indifference and apathy prevail everywhere. There is as yet no strong impetus of public opinion behind the movement. It is to the educated classes that we must look to build up and shape public opinion. Most people can help in a small degree at least. You can help even by studying the subject yourself and inducing others to take an interest in it. An excellent example of what can be done is afforded by the Young Men's Indian Association, who have given their services in organising the present Exhibition. We appeal to employers of labour to interest themselves in the welfare of their workers; to follow the example others have set, such as the Imperial Tobacco Company, the Kolar Gold Mines. We appeal to ladies who preside over large households to care for the welfare of their servants' quarters. And finally we appeal to all to advertise the movement and to help to carry the gospel of child welfare to every home in the land.

"And, in conclusion, let me ask you to join me in bestowing our encomiums on those who have worked to promote child welfare in Bangalore. Dr. Amritraj has done fine pioneer work and deserves well of the citizens of this town. Col. Standage's advice and guidance have been of the greatest value."

National Baby Week was held at the same time and was very successful, the daily attendance being over 5,000. Over 4,000 babies were brought for competition, and photographs at the end of Dr. Amritraj's report bear striking testimony to the splendid physique of babies attended to by the health visitors or cared for in the crèches.

A special report on ankylostomiasis is included in the report, by S. A. S. B. R. Hanumantha Rao, L.M.P. The children at the Baldwin's Girls' School were examined, using the Ellis flotation test; 32.8 per cent. of the children were found to be infected and 90 treatments with oil of chenopodium were given.

Child welfare and maternity work was continued throughout the year, and an additional centre for the Mahomedan community opened in Blackpally. The Child Welfare Association in Bangalore owes a debt of gratitude to (Dr.) Mrs. Austin who has for nearly three years taken a most active share in the work as a voluntary worker, inspecting slums and rendering professional services in the ante-natal clinics, and her departure from Bangalore will be much felt. Three other lady doctors who were serving on the committee have also left for England, and the local association has

therefore been deprived of their services. Clothing and bedding was distributed to needy women and children, 86 women were attended to in the Apar ante-natal wards and emergency labour room; two Indian lady pupils received training; the welfare centre at the Peninsular Tobacco Co.'s factory did excellent propaganda work; and in all five centres and two sub-centres were maintained, worked by a staff of 3 lady health visitors, 10 circle midwives, 3 crèche nurses and establishment. The local maternity and child-welfare association has now been in existence for four years and has done a vast amount of good.

In connection with medical inspection of schools 1,645 children at 16 institutions were inspected. The present grant is only Rs. 400 per annum, and a part-time staff is all that can be maintained for this sum. A full-time worker is really required. In general sanitary conditions in the schools were good, but there is no compound wall around the Old Poor House Road School, so that during the nights its plinth becomes a resting place for beggars; whilst the Rahmania School is insufficiently lighted and ventilated and has no playground.

On the veterinary side the new buildings at the Municipal Veterinary Hospital, Railway Feeder Road, were brought into use; under a grant of Rs. 64,000 from the Government of India this hospital is exceptionally well built and well equipped. No less than 10,070 animals were treated during the year, diseases of the skin and of the digestive tract predominating. Anti-rabic treatment was given to 7 dogs who were all known to be alive at the end of the year under report.

The Municipality of Bangalore and especially Dr. Amritraj are to be congratulated on a report which records steady progress from every aspect.

CHEMICAL EXAMINER'S DEPARTMENT, BENGAL. ANNUAL REPORT FOR 1924. BY MAJOR T. C. BOYD, I.M.S. BENGAL SECRETARIAT BOOK DEPOT: CALCUTTA, 1925. PRICE RE. 1-2-0.

THE year 1924 saw the jubilee of this department's existence, and Major Boyd was in charge throughout the year. The number of articles examined was 5,419. During the year Major Boyd under official instructions visited the Government Quinine Factory at Mungpoo and reported on questions relating to weight and moisture of finished quinine salts. A committee was also appointed and drew up a new and revised schedule in connection with the Poisons Act, Bengal. A new syllabus was also drawn up in connection with the lectures in organic and inorganic chemistry at the Calcutta Medical College, making the course of lectures more up to date and fulfilling the needs of the modern medical student in chemistry.

A small scale extraction plant was erected in the department during the year, the property of the Calcutta School of Tropical Medicine; this plant should prove very useful in the analysis of Indian indigenous drugs. A scheme has been put up to government for the conversion of one of the large store rooms into an extra laboratory, and for the installation of electric light in several rooms. Official evidence was given in connection with the Maniktolla bomb case and the Mirzapur Street bomb case.

In the general department, 1,642 articles were examined. These included specimens of opium, ganja and hemp, charas, cocaine, liquors, chloroform, ghee, mustard oil and explosives. The practice of doping country-made spirit with aconite is still prevalent and highly dangerous. Opinion was asked for on such subjects as standard specifications for carbon tetrachloride for internal administration, nickel-plating of surgical instruments, and the preparation of pH and other biochemical solutions.

In the medico-legal department 3,777 articles were examined in connection with 1,816 cases, and were received from all over India. Poison was detected in 198 out of 668 human viscera sent for examination;

opium being the poison most commonly encountered—117 cases, followed by arsenic, oleander and aconite. Of the 668 cases concerned, the medical officers who sent in the viscera could give no opinion as to the cause of death in 505; in 159 of which poison was detected. Poison was also detected in 71 out of 147 specimens of vomited matter. The total percentage of detection in cases of human poisoning was 35.5 per cent.

The viscera of 104 cattle were received in connection with animal poisoning, and poison was detected in 49; the commonest poison being arsenic.

Articles alleged to be stained with blood numbered 1,465 in connection with 451 legal cases. Blood was detected in 830 of these articles, and was found to be of human origin in 718 by the Imperial Serologist. In connection with 246 cases of rape and allied offences, 384 articles were examined for seminal stains.

The following cases of interest are abstracted from a very interesting series contributed to the report by Senior Assistant Surgeon Hira Lal Singha, B.A., L.M.S., who is in charge of the medico-legal department:—

"Poisoning due to careless dispensing.—(1) The Coroner of Calcutta forwarded the viscera of a Hindu male child aged about 1 year with the following history: The child was given $\frac{1}{2}$ ounce of castor oil from a phial labelled 'Castor Oil' dispensed by a local druggist. The child became uneasy soon after its administration and began to vomit and purge and he was removed to the Campbell Hospital in a state of collapse and died within an hour after admission. Aconite was detected in the viscera of the child. The phial labelled 'Castor Oil' was also forwarded for analysis. Tincture of aconite was found in the phial and not castor oil.

(2) The Deputy Magistrate of Howrah forwarded two paper packets, each containing a quantity of bark, with the history that the bark contained in one of the paper packets was sold to the investigating officer by a shop-keeper as *kurchi* bark (*Holarrhena antidysenterica* bark). The bark in the other paper packet was bought by a person from the same shop for the treatment of dysentery, who after taking a decoction of the bark suffered from severe symptoms of strychnine poisoning, but recovered. The barks in both of the paper packets were found on analysis to be *Nux vomica* bark.

The substitution of *Nux vomica* bark for *kurchi* bark is not uncommon in Bengal in bunias' shops.

(3) The Deputy Commissioner of Police, Calcutta, forwarded a sample of a powder which was supposed to be prescribed by a doctor for asthma. It is said that soon after taking a small quantity of the powder, the patient complained of a burning sensation in the stomach. He however recovered after treatment. The powder on analysis was found to contain aconite.

(4) Yellow Phosphorus poisoning.—The viscera of an adult male were forwarded by the Coroner of Calcutta with the history that the deceased being overwhelmed with grief at the sudden death of his son by accidental burns, took with liquor some "rat-out poison." He was removed to the hospital, but died soon after admission. Yellow phosphorus was detected in the viscera. Poisoning by yellow phosphorus is rare in Bengal.

(5) Aconite Poisoning from "pachwai" (country liquor).—(a) Non-fatal.—The Sub-divisional Officer of Vishnupur forwarded several samples of *pachwai* (liquor) and *bakhar* (ferment used for preparing *pachwai*) with the history that several men took *pachwai* from a licensed vendor. After drinking, they all commenced vomiting and purging and soon after became senseless. They eventually recovered.

Aconite was detected in the remnant of *pachwai* taken by the affected persons. Aconite was also detected in three specimens of *pachwai* seized from the vendor's shop as well as in two specimens of *bakhars*, also seized from the same shop.

Cases of poisoning by aconite from drinking *pachwai* sophisticated with aconite are referred to this department every year from the localities where *pachwai* drinking is in vogue. It is to be regretted that such poisonings occur from the liquor manufactured and sold

by vendors, who probably mix the poison to increase the intoxicating property of the liquor.

(b) Fatal.—(1) The Civil Surgeon of Burdwan forwarded the viscera of an adult Hindu male who was supposed to have died after drinking *pachwai*. Aconite was detected in the viscera.

(2) The Civil Surgeon of Birbhum also forwarded the viscera of an adult male with the same type of history after drinking *pachwai*. Aconite was detected in the viscera.

(6) Aconite poisoning from a 'love-philtre'.—The viscera of a Muhammadan male was forwarded by the Assistant Surgeon of Patuakhali (Bakarganj) with the history that the wife of the deceased was given some medicine by a *fakir* with instructions to give it to her husband 'to correct his temper and to make him love her.' After taking the medicine the husband vomited several times and died. Aconite was detected in the viscera sent for analysis.

(7) Strychnine poisoning (suicidal).—The viscera of a young female were forwarded by the Assistant Surgeon of Tamluk for analysis but he could not give any definite opinion as to the cause of death. The history of the case given by the police is as follows: 'A quarrel was going on between the deceased and her husband and an hour prior to her death the husband gave her a slap and a push on her abdomen causing severe injury inside her body.' At the post-mortem examination held 14 hours after death rigor mortis was present in the lower limbs. All the internal organs were found deeply congested. Analysis revealed the presence of strychnine in the viscera.

8. Arsenic poisoning (reported as cholera).—The Civil Surgeon of Birbhum forwarded the viscera of a young Chamar female with the history that the deceased died of cholera, but that the villagers suspected foul play. The *chorakidar* after confidential enquiry also reported that she died of cholera, but as her death was suspicious, the body was sent for post-mortem examination in which most of the organs were found healthy. The stomach contained 2 ounces of sanious looking liquid and the intestines, both large and small, contained semi-solid feces. The bladder was found empty. The medical officer reserved his opinion as to the cause of death. Arsenic was detected in the viscera. Death in this case was probably due to severe shock, which occasionally occurs in arsenic poisoning and not to the action of arsenic as an irritant poison as the bowels were found loaded.

(9) Hydrocyanic acid poisoning.—The Coroner of Calcutta forwarded the viscera of an unknown male aged about 60 years who was found lying dead early in the morning on the footpath of Lower Circular Road. No mark of violence or injury was visible on the body. On post-mortem examination, the stomach was found highly congested, injected and covered with ropy shining mucus having a peculiar odour. Hydrocyanic acid was detected in the viscera sent for analysis.

(10) Disabling bullocks with sulphuric acid.—The Subdivisional Officer of Dacca sent some scrapings from the neck of three bullocks for the detection of any caustic material, with the history that the three bullocks had inflammation of the skin and subcutaneous tissue on the neck in front of the hump, which though not very severe had interfered with the general usefulness of the three animals.

Sulphuric acid was detected in the scrapings. The use of sulphuric acid with the malicious intention of disabling bullocks is novel."

Correspondence.

B. I. P. P. IN SEPTIC WOUNDS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I was much interested in the article advocating the use of B. I. P. P. in septic wounds, published in

your issue for March 1926, by Dr. R. J. L. Sladen, F.R.C.S., D.P.H.

I had an extensive experience of the use of B. I. P. P. from 1917 to 1920 in a war hospital, where its use was introduced by Lieutenant-Colonel (then Major) Lapsley, I.M.S. It was used extensively for bomb and shell wounds, foul ulcers, sinus cavities, etc. The procedure adopted was to finally clean out the cavities with rectified spirit, sterilise the B. I. P. P. on a water-bath, and apply it with a sterilised swab or spatula. I was amazed at the results obtained,—far better than those with any other method.—Yours, etc.,

P. K. SEN GUPTA, L.M.P.,
Sub-Assistant Surgeon.

BORJOHA DISPENSARY,
P. O. NOWGONG, ASSAM.
1st April 1926.

INFANTILE CIRRHOSIS OF THE LIVER.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I read the article on infantile cirrhosis of the liver in your issue for February 1926, by Dr. N. Gopalan with much interest. I have had three cases of this disease under my treatment, but, I regret to say with negative results; I have not tried hydrotherapy. I have given sulfarsenol injections, but with no effect. The first patient appeared to improve slightly, but then suddenly developed severe jaundice, which terminated fatally. In the second case there was no jaundice, but the child became listless, ascites developed, and the case terminated fatally. The third patient is still under treatment, but is going downhill. The disease is prevalent in this part of the country and appears to especially affect Brahmin children.

Can any of your readers enlighten me as to its aetiology and treatment?—Yours, etc.,

P. D. SAMUEL, L.C.P.S.

PARLAKIMEDI,
C. B. M. DISPENSARY.
5th April 1926.

ANTI-PLAGUE VACCINE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—From a lecture delivered by Dr. S. P. B. Naidu, Plague Research Officer of Bombay, at the Osmania General Hospital, Hyderabad, Deccan, on the 22nd March, 1926, and from conversation with him I gather that the authorities of Parel Laboratory at Bombay are trying to improve the present Haffkine's prophylactic vaccine.

They have found that the clear filtrate or supernatant fluid of Haffkine's prophylactic is quite efficacious and has an even better protective power against plague than the whole fluid, and that the sediment is not essential.

This fact and even more I have found from personal experience and experiments performed on rabbits at Hyderabad, the results of which were published in the *Indian Medical Record*, 3rd January, 1900, and in the *British Medical Journal* of May 12th, 1900, a quarter of a century ago. A historical note on Haffkine's fluid is worth mentioning as it is interesting. In the early days Haffkine's fluid was supplied in ordinary medicine bottles, corked and sealed with sealing wax. I was the first to show that some bottles were found contaminated and that the use of the cork was objectionable as it could not be sterilised and I suggested that the fluid should be supplied in sealed tubes (*Indian Medical Record*, 10th January, 1900). The present sealed bulbs known as Maynard's bottles were introduced, as far as I remember, in 1906, a long time after the Mulkowal accident of 1902. This unfortunate accident occurred in the Punjab when 19 persons died of tetanus after inoculation from a certain single bottle of plague prophylactic, the inoculations having been performed in the open. The cause of the accident was due to infection

of the bottle by the cork falling on the ground while opening it and thus getting infected. This cork, instead of being singed or burnt over a spirit flame, as suggested by Haffkine, was merely dipped in carbolic lotion before replacing it. A drop of this carbolic lotion must have trickled into the prophylactic broth fluid and thus the tetanus germs were introduced into it. As the bottles were closed with corks in those early days it was sometimes impossible to prevent the cork falling while opening the bottle.

Before the introduction of sealed bulbs when corks were in use Haffkine's prophylactic fluid was re-sterilised here in Hyderabad for three consecutive days at 60°F. for 15 minutes each day and was then issued to medical officers in the districts. It was then found that the re-sterilised fluid produced less reaction, both local and general, than the original vaccine.

Up to the present day the general opinion is that the protection produced by Haffkine's fluid is due to the action of dead plague bacilli and their products, and hence it is directed that the bottles be well shaken before use, so that both dead bacteria and their products are used in inoculation. In 1900 I published my finding that the filtrate of Haffkine's fluid, free from sediment containing dead plague germs, is not only efficacious in producing immunity but it is better than the whole fluid as it does not cause induration at the site of injection.

These indurations or lumps generally last for three or four months and are slowly absorbed. They contain sterile pus, as shown by me. I found also that rabbits inoculated with whole Haffkine's fluid lose weight during absorption of these indurations. As I found that the filtrate has a better protective power and does not produce hard lumps, my usual procedure in using the Haffkine's fluid is as follows:—

The bottles, after being well shaken, are kept aside some days with the pointed end directed upwards. After a few days it is found that the fluid becomes quite clear and at the bottom one finds an ash-coloured sediment which consists of dead plague bacilli. After opening the bulbs I withdraw the clear supernatant fluid and inject persons with it in the required quantities, rejecting the bottom sediment. With this I found less reaction and better results without producing any induration and have always been satisfied with the results. One great advantage in using the clear supernatant fluid only is that contamination can be easily detected as the fluid becomes turbid on contamination. In that case the bottle should be rejected.—Yours, etc.,

S. MALLANNAH, M.D.

HYDERABAD-DECCAN,
29th March 1926.

THE INDIAN MEDICAL YEAR, 1925. A CORRECTION.

We have received a letter from Dr. Y. S. Row, Alipuram Jail Hospital, Bellary, drawing our attention to the phrase in column 2 of p. 4 of this review, "records the occurrence in four years in Alipuram jail of three cases of what was apparently acute yellow atrophy of the liver, without apparent cause, the aetiology of which was obscure." He points out that in the first two instances, as noted by him on p. 580 of our issue for December, 1925, the diagnosis was not only established at post-mortem examination, but also confirmed on section and examination of the liver by the Professor of Pathology, Medical College, Madras. In the third instance the findings at post-mortem examination were identical with those seen at the previous examinations, but material was not sent for section cutting and examination.

We much regret the error; and the word "apparently" should certainly be deleted. The cases were undoubtedly acute yellow atrophy of the liver.

In trying to review a large mass of medical literature within as brief limits as possible, it is only too easy to make misstatements. A further correction, in the first

column of "The Indian Medical Year, 1925," is to read "180 square feet" in place of "180 feet square"—an obvious *lapsus calami*! A room 180 feet square might be commensurate with the needs of a Malarial Bureau for all India; the actual one, which is about 180 square feet, is wholly inadequate.

The impression which we were trying to convey to the reader was that here in Alipuram jail, during the course of four years there had occurred three sporadic and fatal cases of acute yellow atrophy of the liver. We believe that the present-day view held with regard to this condition is that it is of toxic origin; that whilst chronic poisoning of the liver from alcohol or other causes is only too common and leads to hepatic cirrhosis, acute poisoning of the liver, leading to acute yellow atrophy, is very rare and noteworthy. Acute yellow atrophy has been known to occur in pregnancy, it has followed surgical operations and with sudden onset, it occurs in poisoning with T. N. T. and in poisoning with the organic arsenical derivatives in the "nitritoid crises" which sometimes follow injections of these preparations. It is also, however, a not infrequent finding at post-mortem examinations upon fatal cases of Weil's disease (acute spirochaetal jaundice). For some years several workers in India have been trying to discover whether Weil's disease occurs in India, as it does in other countries;—the curious epidemic jaundice of the Andamans, which only occurs at certain seasons of the year, and then only among prisoners working in wet fields, is an example of what may—or may not—be Weil's disease. Any definite evidence for or against the view that Weil's disease occurs in India would be welcome; and it was with such an idea in view that the unfortunate word "apparent" was used. These cases of acute yellow atrophy of the liver seem to be more common in prisons in India than elsewhere, and a diagnosis of "acute yellow atrophy" is only a clinical diagnosis; it does not incriminate the aetiological agent. If Dr. Row has any further cases of the condition, we hope that he will not only send material preserved in Zenker's fluid to some competent pathologist for examination; but also material preserved in 10 per cent. formalin-saline for examination for leptospiræ.—EDITOR, I.M.G.

A MICROTEST FOR BLOOD SUGAR.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—The test at present in use for estimating the blood sugar content is Maclean's test. It is a little cumbersome and requires gas for heating purposes, and in consequence is unsuitable for medical practitioners in the mofussil. In the *Journal of the American Medical Association* for January 16th, 1926, p. 238, there is an abstract on a method advocated by Johannsen, a micro-test which is a modification of Jaffé's picric acid creatinin test. But the description is not a full one; six test tubes are mentioned in the description, of which only two—or three including the graduated tube—are made use of. Perhaps the other tubes contain bichromate solution of different strengths, but if so the actual strengths are not given. Could you or any of your readers give a full account of the test?—Yours, etc.,

MURARI S. K. AYYAR, M.B., C.M.

MYLAPORE, MADRAS,
25th February, 1926.

(Note.—We have shown the above letter to Dr. J. P. Bose, Diabetes Research Worker, Calcutta School of Tropical Medicine, who remarks that the method has undergone several modifications in the hands of Lewis, Benedict, Meyers, Baily and others, but has never yet obtained universal acceptance. The main objection to this method is that the picric acid reagent employed in the test reacts with the creatinin of the blood, and this tends to make the reading of the blood sugar value higher than it actually is.

We have not had access to Johannsen's original description, but the following abstract is taken, with acknowledgments, from the number of the *Journal of the American Medical Association* mentioned.

"*Microtest for Blood Sugar.*—Johannsen extols the ease, simplicity and rapidity of the Becher-Herrmann technic. The findings with it paralleled astonishingly those of the more complicated methods in his extensive experience with it. It is based on the Jaffé picric acid creatinin test. The blood (0.10 cc.) is placed in the first of a set of six tubes, containing 1.9 cc. of distilled water, and then 1.5 cc. of a 1.2 per cent. solution of picric acid is added. After mixing, the fluid is decanted through a filter into a graduated test tube to the line for 2.1 cc. Then 0.3 cc. of a 4 per cent. solution of sodium hydroxid is added, bringing the fluid to the 2.4 cc. mark, and it is boiled for one to one and a half minutes, filling with distilled water to maintain it at the 2.4 cc. mark. The fluid is filtered anew into another test tube of the same calibre. The colour of the fluid then, if it contains 0.10 per cent. of sugar, is identical with that of a 0.25 per cent. solution of potassium bichromate. The reagents keep well."

CHOLERA IN THE PUNJAB IN 1925.

LIEUTENANT-COLONEL C. A. GILL, I.M.S., whose article with the above title appeared in the January number of the *Indian Medical Gazette*, wishes to correct any misapprehension that may have been caused by the statement that his endeavour to obtain information from the Kashmir authorities regarding the prevalence of cholera in that State in January 1925 "unfortunately met with no response."

It has been ascertained that the letter on the subject sent to the Director of Medical Services, Kashmir, was not received by him, and it consequently follows that the absence of a reply was due to causes beyond the control of the medical authorities of Kashmir State, whose hearty co-operation in the prevention of epidemics and more especially in the study of malaria in Kashmir, Colonel Gill desires to take this opportunity of acknowledging.

Service Notes.

We congratulate Lieutenant-Colonel S. R. Christophers, C.I.E., O.B.E., I.M.S., upon his election as a Fellow of the Royal Society of London.

APPOINTMENTS AND TRANSFERS.

The services of Lieutenant-Colonel A. B. Fry, C.I.E., D.S.O., M.D., I.M.S., are placed at the disposal of the Government of India, Army Department.

Lieutenant-Colonel L. J. M. Deas, I.M.S., on return from leave, resumed charge of his appointment as Residency Surgeon and Chief Medical Officer, Baluchistan, with effect from the 18th March 1926.

The services of Lieutenant-Colonel T. C. McCombie Young, M.D., I.M.S., are placed temporarily at the disposal of the Government of Bombay with effect from the date on which he assumes charge of his duties as Officiating Port Health Officer, Bombay.

Major (now Lieutenant-Colonel) H. W. Illius, C.I.E., I.M.S., to be acting Lieutenant-Colonel from 15th August 1918 to 13th November 1920 whilst employed with the Mesopotamian Expeditionary Force.

Major (now Lieutenant-Colonel) R. T. Wells, M.D., I.M.S., to be acting Lieutenant-Colonel from 6th January 1919 to 28th April 1920 whilst serving with the Egyptian Expeditionary Force.

Major C. J. Stocker, M.C., I.M.S., an Officiating Agency Surgeon, on return from leave, is posted as Agency Surgeon at Meshed and *ex-officio* Assistant to His Britannic Majesty's Consul-General and Agent to the Government of India in Khorasan, with effect from the 1st April 1926.

Major L. A. P. Anderson, I.M.S., is appointed substantively to the Medical Research Department.

LEAVE.

Dr. C. A. Bentley, M.B., D.P.H., D.T.M. & H., Director of Public Health, Bengal, has been granted by the High Commissioner for India an extension of leave on half average pay for six months.

RETIREMENT.

The King has approved the retirement from service of Lieutenant-Colonel W. M. Pearson, M.B., I.M.S., with effect from the 3rd March 1926.

PROMOTIONS.

Lieutenant-Colonel to be Colonel.

Hamilton Maxwell Cruddas, C.M.G., O.B.E., vice Thomas Barnard Kelly, D.S.O., F.R.C.S.E., with effect from the 9th March 1926. (Colonel Cruddas's tenure of appointment will reckon from the 10th March 1926.)

Majors to be Lieutenant-Colonels.

John Taylor, D.S.O., M.D. Dated 1st March 1926.
Alexander Dron Stewart, M.B., F.R.C.S.E. Dated 1st March 1926.
Robert Alexander Chambers, O.B.E., M.D. Dated 1st March 1926.
Robert Henry Bott, C.I.E., M.B., F.R.C.S. Dated 1st March 1926.
John Morison, M.B. Dated 1st March 1926.
Samuel George Steele Haughton, M.D., M.A.O. Dated 1st March 1926.
Andrew Smith Leslie, M.D. Dated 1st March 1926.
Joseph Frain James, M.B. Dated 1st March 1926.
Alexander Patrick Gordon Lorimer, M.B. Dated 1st March 1926.
Herbert Bodley Scott, O.B.E., F.R.C.S.E. Dated 1st March 1926.
George McGregor Millar, O.B.E., M.B. Dated 1st March 1926.
Harold Hog Thorburn, C.I.E., M.D. Dated 1st March 1926.
Francis Hugh Salisbury, M.B. Dated 1st March 1926.

Lieutenants to be Captains.

Som Dutt, M.C. Dated 20th May 1925, but to rank from the 24th June 1919.
Dawarka Prasad Bhargava, M.B., F.R.C.S.E. Dated 20th May 1925, but to rank from the 4th* June 1923.
The undermentioned officer is permitted to retain the rank of Captain, subject to His Majesty's approval:—
Krishnaji Nilkant Chhatre. Dated 1st September 1924.

* Grading after allowing for break in service.

NOTES.

BISTOVOL, MAY AND BAKER.

A NEW preparation of considerable interest is bismuth acetyl-amino-oxyphenyl-arsinate, introduced by Professor C. Levatidi of the Institut Pasteur, Paris, for intramuscular injection in the treatment of syphilis, and now prepared under the trade name of Bistovol by Messrs. May and Baker, London. The following is an abstract from Professor Levatidi's report on this new product in the *Lancet* of the 30th January, 1926:—

"In the Harben lectures, delivered in December, 1923, and subsequently published in the *Journal of State Medicine*, I discussed the therapeutic action of bismuth in syphilis, and that of arsenic administered per os in the form of stovarsol. My later investigations into the action of stovarsol in yaws, amœbiasis, spirillary infections, and malaria will be found in a paper in *The Lancet* of September 19th, 1925, p. 593.

We shall now report our investigations concerning a new compound containing both bismuth and arsenic—namely, basic acetyloxaminophenyl arsinate of bismuth.

When, under certain conditions, the sodium salt of acetyloxaminophenyl arsinate (stovarsol, As content 27 per cent.) and sodium potassium bismuth-tartrate (Bi, 30 per cent.) are brought together, both in concentrated aqueous solution, a white precipitate appears. This precipitate, after several washings, when dried at 56°C., appears as a yellowish-white powder, insoluble in water, but soluble in caustic bases. Chemical analysis proves this substance to be a new compound.

We have had the action of this compound under investigation since October, 1924. Our results are as follows:—

Experimental Syphilis.—The salt has been used as a flocculent suspension either in saline or in oil (10 per cent.). The injection was made into the muscle.

(a) Suspension in saline: Bi = 0.0125 g. per c.cm. As = 0.00457 g. per c.cm.

Rabbit 50: Severe lesions, showing numerous treponemata. Weight, 3330 g. Received 1.0 c.cm. per kg.—that is, 0.0125 g. Bi and 0.0045 g. As. Oct. 12th, 1924: Complete healing after four days. No loss of weight. No relapse.

Rabbit 51b: Severe lesions, numerous parasites. Weight, 2700 g. Received 0.5 c.cm. per kg.—that is, 0.00125 g. Bi and 0.00045 g. As. Oct. 23rd, 1924: Complete healing after five days. No relapse.

Rabbit 12b: Severe lesions, numerous treponemata. Weight, 2900 g. Received 0.1 c.cm. per kg.—that is, 0.00125 g. Bi and 0.00045 g. As. Oct. 23rd, 1924: Complete healing after five days. No relapse.

Given in a dose of 0.05 g. per kg. the compound showed no effect. It follows that the bismuth-arsenic derivative administered as a flocculent suspension in saline proves to be efficient in the cure of experimental syphilis with a dose of 1.5 mg. Bi per kg. The ratio of the curative to the toxic dose C/T exceeds 1/10 (estimated as Bi).

(b) Oil suspension: (10 per cent.: 0.041 g. Bi and 0.015 g. As. per c.cm.).

Rabbit 76b: Chancres of the scrotum with numerous parasites. Weight, 2600 g. Received 1.0 c.cm. per kg. (0.041 g. Bi and 0.015 g. As.) on January 12th, 1925. The lesions quickly healed.

Rabbit 804A: Severe lesions, many parasites. Weight, 1850 g. Received the same dose (0.041 g. Bi and 0.015 g. As per kg.). Complete healing without relapse after five days.

These findings prove that the arsenic-bismuth compound in an oil suspension exhibits a curative action in experimental syphilis in a dose of 0.041 g. Bi per kg. Our experiments in mouse nagana and fowl spirillosis demonstrated that the new derivative is also efficient as a preventive and curative agent in the case of these infections (the preventive dose for the fowl corresponds to 0.0036 Bi per kg.).

These results induced us to try the new product in the treatment of human syphilis. The findings of Messrs. Fournier and Schwartz brought full confirmation of our own results. These authors have treated 20 syphilitic patients with chancres or secondary lesions. In spite of the small number of patients and of the short period of time since the beginning of the treatment they are firmly convinced of the high therapeutic value of the product. Nineteen patients received 12 intramuscular injections of 2 c.cm. each of a 10 per cent. oil suspension—i.e., 0.984 g. Bi and 0.36 g. As). A single patient was given two series of ten injections with a month's interval between. The injections were given twice a week. The drug was perfectly tolerated, there was no painful local reaction, and no general reaction. One patient, however, showed, after 12 injections, a mild erythema of the arsenic-erythema type. There was no albuminuria and no irritation of the gums. The general condition always remained perfect with no weariness and no loss of weight, as may be observed in the use of a number of bismuth compounds. Probably this favourable characteristic is due to the presence of arsenic, which renders the drug specially useful for patients in poor condition.

The treponemata disappeared 24 to 48 hours after the first injection; with two patients the sterilisation of the lesions followed the second injection. The cicatrization was effected very rapidly, as with any of the best bismuth preparations. The drug had a similar action on all general manifestations when they were present. Fourteen patients, who were kept under observation during subsequent months, did not show any relapse.

The effect on the blood reaction was quite obvious. With two patients who had a negative blood W.R. it constantly remained negative, but of 12 subjects with a positive blood W.R. 6 gave a negative result a few days after the treatment; with 4 others the blood W.R. was attenuated; and with the 2 last the reaction was not quite so favourably influenced.

From the above findings Messrs. Fournier and Schwartz drew the following conclusions:—

1. The basic acetyloxyaminophenyl arsiniate of bismuth is perfectly tolerated and is not handicapped by the inconvenience met with in the use of the ordinary bismuth compounds.

2. The effect on the treponema and on the lesions appears as quickly as it does with the best anti-syphilitic drugs. No relapses are observed.

3. The effect on the blood reactions is quite obvious. A negative test may be obtained after a single series of 12 injections.

These facts have been fully confirmed by Messrs. Nicolau, Doskocil, and Galloway, who have examined the action of the arseno-bismuth derivative in the experimental trypanosomiasis of the mouse and rabbit (nagana) and in fowl spirillosis. The compound has proved to have an evident spirillicide and trypanocide effect *in vivo*.

Lastly, further reasearches by Mr. Popoff furnish another attestation of the above-reviewed facts. This investigation concluded that "the basic acetyl-oxyaminophenyl arsinite of bismuth has a high antisiphilitic power in the primary or secondary stages of the disease, and even in an old latent syphilis the treponemata disappear and the lesions become cicatrised, while the blood test becomes negative. The change in the blood reaction often takes place some time after the end of the treatment, which proves that the action of the drug is extended over a long period of time. From this point of view it behaves like the bismuth compounds which form a 'depôt' assuring the lasting and deep therapeutic effect of the metal."

Dosage.

Bistovol is administered by deep intramuscular injection only, the site recommended being the muscles of the gluteal region just below the iliac crest. The ampoules, which contain a few glass beads in order that the suspension may be rendered homogenous, should be well shaken before use.

For adults a series of 12 injections of 2½ to 3 c.c. is given at intervals of four to five days.

For children up to five years of age doses of ½ c.c. may be given: those of from five to twelve years may receive 1 c.c., while for those of twelve to fifteen years 1½ c.c. is a suitable dosage.

These quantities may be altered at the discretion of the practitioner.

It is important to see that the patient's mouth be kept thoroughly clean, and that the urine is examined.

Bistovol is supplied in boxes of 12 ampoules, each ampoule containing 3 c.c. of a 10 per cent. suspension in oil."

I. G. N. AND R. S. N. JOINT COMPANIES' STEAMER SERVICES.

We have received the time and fare table of the Joint India General and Rivers Steamer Navigation Companies. It is a most attractive pamphlet, well got up, and with excellent illustrations of scenes on the Ganges and Brahmaputra. To anyone in search of a real rest cure,—as distinguished from a mere round of jazz and

frivolity,—we can strongly recommend the river trips of these companies, from personal experience. The trip from Calcutta round the Sunderbuns to Goalundo, returning by rail, takes four to five days and traverses some wonderful scenery; whilst the trip through the Assam valley from Goalundo to Dibrugarh takes eight days. The steamers carry some 10 to 12 first-class passengers and are fitted with electric fans and every comfort. The messing is usually excellent.

The time table will also be of interest to medical men in Eastern Bengal and Assam.

BOVRIL, LTD.

29th Annual General Meeting.

PRESIDING at the twenty-ninth annual general meeting of Bovril Limited, held in London on 25th February, 1926, Sir George Lawson Johnson (chairman) congratulated the shareholders on having had another successful year.

The sales of Bovril in 1925 had been larger than those of any previous year, and they showed a greater increase over the 1924 figures than the latter had shown over the figures for 1923.

There had been no "sinking feeling" about the export side of their business, either. Their overseas sales for 1925 had again shown a very gratifying expansion, and judging from the sales to date there was every indication of this continuing.

The Bovril Company was an association consisting largely of small shareholders, the average holding being only £230 each, nominal value. Half of the shareholders were ladies, showing that those who know most about the virtues of Bovril think it good policy to be interested in it financially also.

The uses of Bovril are manifold, and one hears of its use in quite unexpected quarters. A little time ago the following appeared in a London paper:—

"Two bandit bird-eating spiders have arrived at the London Zoo from Brazil. Each is bigger than a man's hand. It was considered imprudent to feed the spiders during their voyage, and on reaching London they showed signs of 'that sinking feeling.' A good drink of Bovril soon revived them."

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o The Calcutta School of Tropical Medicine, Central Avenue, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

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The Editors of the *Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

Original Articles.

PRICKLY HEAT.

By HUGH W. ACTON,

MAJOR, I.M.S.,

Officer in charge of Skin Clinic, School of Tropical Medicine and Hygiene, Calcutta.

THIS affection of the skin is well known to the lay public under the common English name of prickly heat; in the vernacular Bengali—*ghama-chi*, Urdu—*pith*, and in Telegu—*vadagullah*. These terms are sufficiently descriptive as they indicate that it is a prickly rash that occurs on the skin during the hot weather. I am averse to the use of Latin words for skin diseases in India; as many of our students have no knowledge of this language and Latin words are meaningless to them. At the present time prickly heat is thought to be caused by a high atmospheric temperature, particularly when the air is saturated with moisture. There are others who believe that with the excessive perspiration that occurs during this season, there is not enough oily secretion to protect the sweat-gland mouths; hence these become damp and sodden and are then liable to be infected by secondary organisms. Later on in this article I hope to show the relationship of this condition to seborrhœa of the scalp, and to a general oiliness of the skin. I now look upon prickly heat as due to infection of the sweat-gland mouths by the *Staphylococcus aureus* and *albus*, which is in turn secondary to seborrhœa of the scalp or skin. The ready response of the disease to such remedies as sulphur, resorcin, salicylic acid, and perchloride of mercury, further bears out this view.

Synonyms.—Lichen tropicus, sudamina papulosa, malaria rubra vel papulosa.

Definition.—The disease is characterised by the occurrence of small white vesicles which soon become ruptured, by redness of the skin surface and by the formation of scales. It is due to an infection of the sweat-gland ducts by the staphylococcus. The rash usually appears during the hot moist months of the year. Persons with seborrhœa of the scalp are especially predisposed to this condition which is aggravated by perspiration and coarse clothing.

Actiology.—We have already suggested that it occurs when the temperature rises above 90° F. and when the humidity is high. As regards race it is seen both in the European and Indian, but more commonly in the former owing to his habits as regards exercise and dress.

The custom of wearing a coat, waistcoat and shirt, predisposes to the condition. The regions which are usually attacked first are those where there are three or more layers of damp clothing. The Indian custom of wearing the shirt outside

the trousers allows a greater degree of ventilation of the skin and drying of the damp clothes, and consequently less infection occurs.

Again, the texture of the clothing plays a large part in the severity of the disease. Flannel or rough coarsely woven cloth irritates the skin and by its friction soon ruptures the vesicles, allowing secondary staphylococcal infection of the hair follicles, etc. to occur. The delusion that baldness is due to lack of ventilation and obstruction of the blood-supply to the scalp by the use of hard-rimmed hats can easily be dispelled, as the Bengalees never wear a hat, and baldness is very common amongst them.

In severe cases which I have seen the patients have generally been those who are continually suffering from seborrhœa of the scalp, and also have an oily skin at this time of the year. Seborrhœa of the scalp is particularly common in Bengal and is the great cause of baldness amongst the middle classes, because of the oil they use for their hair and their diet which is rich in fats and sweets. The greasiness of the skin, which may be congenital or acquired, forms a suitable soil for the bottle bacillus to grow, and with it the concomitant staphylococcus. The latter organism falls from the head on the body, or is smeared over the body by the towel which is first used for the head.

Symptoms and Signs.—The rash is commonly seen at the flexures of the elbows, groin, and the lower part of the abdomen, areas which are covered by three layers of clothing. It is also common on the back for the same reason. It is nearly always confined to a part of the body which is covered by clothing and is not exposed to evaporation. In extensive cases it may spread to the neck, chin, and also to the feet, especially if fairly thick woollen socks are worn. When seborrhœa of the scalp is severe the affection is often seen on the forehead as far as the eye-brows. The palms and soles are never affected; the small vesicles containing clear or purulent fluid seen in these regions are due to ringworm. The rash produces a prickly sensation which is aggravated after exercise, or by drinking warm tea, etc. Its appearance at first when examined by the corneal lens is that of a tiny white vesicle situated at the junction of the horny and prickle-cell layer and surrounded by a few dilated capillary tufts. Soon the vesicles become turbid and rupture and the prickle-cell layer is exposed; the lesion is then seen as a deep roseola-like spot covered by a few scales. Later still, when the rash subsides, the surface is covered by a fine yellow desquamation. The lesions have a tendency to be symmetrical when situated on the chin or flexure of the elbow; this symmetry is caused by the infection of one surface from another. At this stage owing to the rub of the clothing—especially if it is coarse—secondary infection by staphylococci often occurs and gives rise to suppuration at the hair mouths, viz., staphylococcal folliculitis, or

more rarely the organisms may infiltrate the sweat ducts after their occlusion by inflammation and give rise to deep boils situated under the corium. This infection of the sweat-glands is particularly seen where the collar rubs the neck, where the braces rub the shoulders or where the seat of the trousers rubs the buttocks, especially amongst those who ride frequently. In debilitated or diabetic persons some of these boils may become carbuncles; in others streptococcal infection gives rise to impetigo or weeping eczema.

Bacteriology.—Scrapings of the skin show large number of staphylococcal clumps situated on the scales. Such large and numerous clumps are rarely seen in the scales in ordinary pustular infections of the skin. On culture, the organisms are mainly the *Staphylococcus albus*, but sometimes *aureus* colonies only develop on the tubes; besides the staphylococci, the bottle bacillus of Unna is seen scattered here and there as small multiplying forms; these are shown in fig. 1; the older yeast-like forms of the bottle bacillus (fig. 2) are seen in large numbers on the oily skin surface of the face, body, and in the dandruff of the hair where the prickly heat is not present.

gradually burrows under this layer, raising it and becoming multilocular. The contents are usually turbid and contain leucocytes, numerous staphylococcal clumps and a few young bottle bacilli.

We have found that when growing on blood agar or ordinary agar the staphylococcal colonies inhibit the growth of the bottle bacilli if they are near them. On rupture of the vesicles the prickle-cell layer is exposed and becomes spongy owing to the dilatation of the inter-epithelial spaces.

The blood vessels of the capillary tufts in the papillæ of the corium are dilated and infiltrated by leucocytes, which migrate towards the prickle-cell layer. In ordinary cases the sweat-glands lie deep below the corium and are not affected, nor are the sweat-ducts further than the prickle-cell layer. The sebaceous glands and hair follicles are usually not involved unless there is folliculitis present as well.

Pathology.—So far two theories have been put forward to explain the production of this disease. Pollitzer's view is as follows. With the increase in the amount of perspiration, the horny layer at the sweat orifices becomes imperfectly

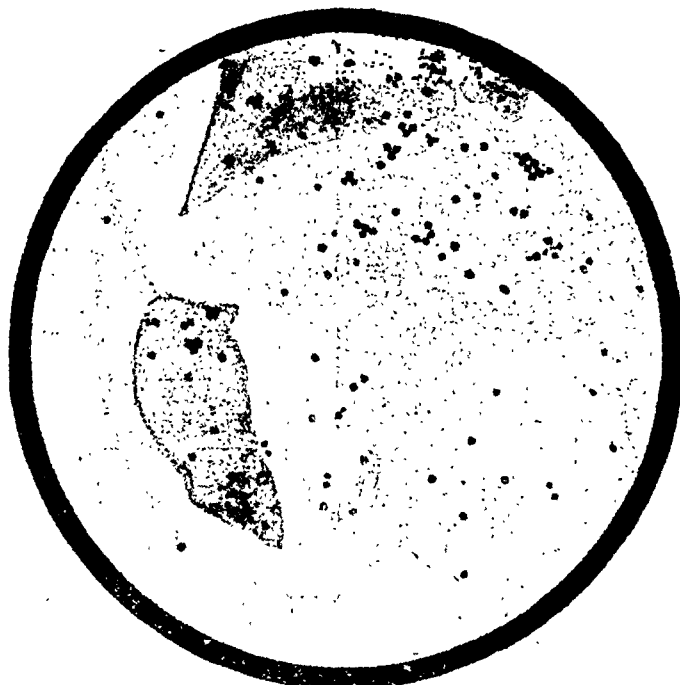


Fig. 1.

Microscopic appearance of the skin from the lesions of prickly heat showing numerous staphylococci.

The relationship of these bacilli to seborrhœa is still doubted by many dermatologists, but we hold that it is the causative agent of this disease. This point will be dealt with separately in a future paper, when we will discuss the causation of seborrhœic dermatitis.

Morbid Anatomy.—Sections of a typical lesion show that the vesicle is situated immediately under the stratum corneum in the position of a sweat-gland duct; with distention the vesicle

cornified, absorbs moisture and becomes swollen, thus blocking the orifice of the sweat-gland duct so that a little vesicle is formed. The second theory is that the lesions are produced by microbial infection, as the excessive perspiration makes the soil suitable for the growth of any organism.

The latter theory does not incriminate any particular organism except perhaps the staphylococcus, which is abundantly found in these lesions.

I consider that the initial changes are due to an infection by the staphylococcus at these sites, which become sodden and suitable by perspiration.

The staphylococci are largely derived from an existing seborrhœic site on the body. My reasons for this opinion are—

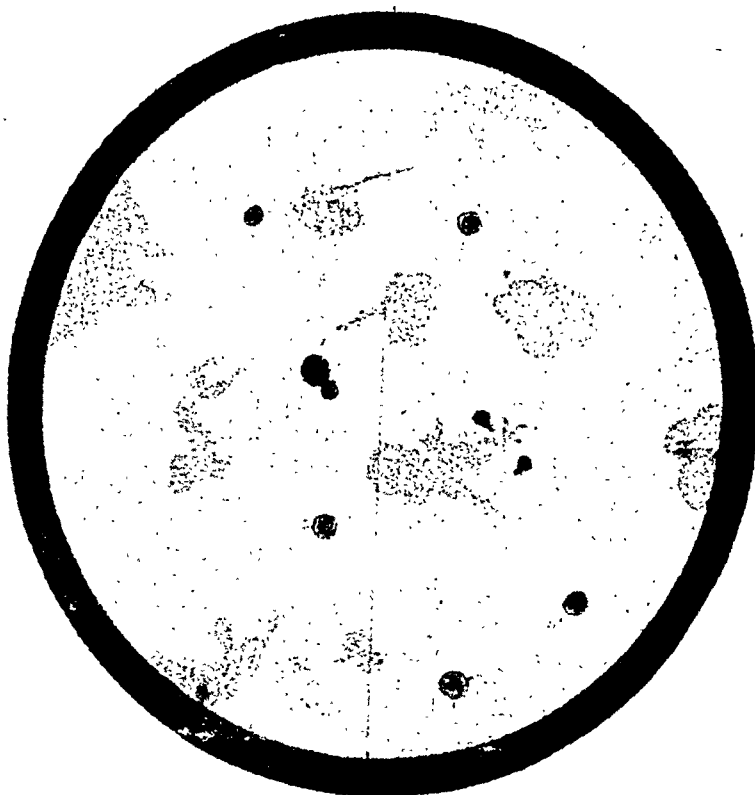
(1) that there exists a close relationship between seborrhœa of the scalp and extensive infection of the body by prickly heat.

(2) that in these lesions the multiplying forms of the bottle bacilli can always be found, although they are few in number, as their growth is inhibited by the predominating staphylococcal infection of the sweat-gland ducts, the seborrhœa

rash but the difference in the character of the lesions can be seen clearly by the corneal lens. Occasionally one has to consider the possibility of syphilis in persons who have exposed themselves to infection and are suffering from a sore throat. A syphilitic rash is totally different in character and distribution, and on dark skins when it fades it often leaves pigmented scars.

Prognosis.—This is extremely good, as the condition can be cured at once without any treatment by a change to a cooler climate, or can be controlled and prevented by persisting in the preventative measures discussed below.

Treatment.—The essential point in the treatment of the disease is to recognise, firstly that the



— Fi. 2.

Microscopical appearance of the skin scraping made from area not affected by prickly heat.

forming the source of supply of these staphylococci.

(3) that the rash yields rapidly to remedies like sulphur, which is a specific for seborrhœa of the scalp. Persons properly treated for seborrhœa rarely show much manifestation of prickly heat during the monsoon months.

Diagnosis.—The naked-eye appearance of the rash is familiar to most people, but in cases of doubt it is better to use a corneal lens when the characteristic little white vesicles can be distinctly made out in the early lesions. Scrapings taken from these vesicles show a large number of staphylococcal clumps and a few bottle bacilli. The bottle bacilli are more numerous on the unaffected skin.

As regards the differential diagnosis, prickly heat has occasionally been mistaken for a typhoid

disease usually starts from the scalp and infects the rest of the body through the agency of the towels, etc., which carry these organisms to the general body surface.

The best treatment for seborrhœa of the scalp that I have found is the use of a soap spirit lotion as follows:—

R

Spiritus rectificati	..	..	3i
Saponis mollis	..	..	3ii
Tinctura lavandulæ	..	quantum sufficit.	

The scalp to be washed twice a week or more with the spirit lotion; in the case of men one advises its use every other day. I prefer the spirit soap lotion in this proportion as compared with Hebra's original formula. About a table-spoonful is rubbed well into the scalp until the

spirit has evaporated, and then washed away with plenty of fresh water.

As a local treatment to the hair I generally use the following hair lotion:—

R		
Euresol	..	grs. 40
Spiritus Aetheris	..	min. 30
Spiritus Rosmarii	..	min. 30 to 60.
Oleum Ricini	..	min. 4 to 8.
Aqua roseæ ad.	..	oz. 1

The lotion should be rubbed into the hair roots night and morning when the hair is being dressed.

I prefer euresol to resorcin as it does not stain the hair, which is important in fair persons. One must persist in this treatment to overcome the seborrhœa of the scalp and its consequent spread to the body. The disease is very apt to light up again as long as the soil is suitable, for like all these fungi the bottle bacillus will only grow on a suitable soil.

Clothing is a very important factor in the spread of the disease. Young children are very frequently attacked by prickly heat as soon as the weather gets hot, and in them the infection is often generalised. The early attack is always due to the anxious mother, who persists in warding off the possible danger of a chill when the temperature stands at 90°F. by over-clothing her helpless child, while she herself is wiser and follows the prevailing fashion of wearing the thinnest and fewest clothes compatible with safety and modesty.

In the tropics silk or linen are the only texture of clothing that any sensitive skin can stand; flannels and *khadar* (country cloth) only aggravate the disease. The fault seen amongst those who ride frequently is that they often wear thick, warm instead of thin, white riding breeches: the former cause an enormous amount of perspiration to collect in this area, being rough they cause trauma and then scatter the staphylococcus well into these lesions.

In the tropics, a wise custom is to bathe twice a day in order to insure cleanliness of the skin, but to avoid the use of too much soap. Many who suffer from prickly heat use strong antiseptic soaps; these tend to irritate the skin rather than to kill off any micro-organisms, and thus they aggravate the disease.

The Bengalee owing to the nature of his diet, which consists of large amounts of fats and sweets, is very apt to suffer from seborrhœa, and by using clothes after the western fashion is as likely as the European to develop prickly heat.

The treatment for the rash is the use of a sulphur and camphor powder which, if used properly, I regard as a specific. I consider that it is necessary to combine the sulphur with camphor, for otherwise one does not get such good results.

The powder I use is follows:—

R		
Sulphur	..	1 part.
Camphor	..	1 part.
Zinc oxide	...	2 parts.
Starch	..	3 parts.
Boric acid	..	1 part.

The powder should be lightly dusted with a powder puff over the affected areas after the morning bath. It is also very useful for preventing re-infection by ringworm of the groin and feet.

There is one danger in the use of this powder and that is that sulphur is an irritant to the skin. Almost all patients suffering from skin diseases want to get rid of their rash as soon as possible; for this reason they are apt to apply the powder too vigorously and may set up a sulphur dermatitis. Therefore they should always be warned that a light dusting is sufficient, and that there is a danger in rubbing in the powder too vigorously. There are many other remedies that can be used, but I have found sulphur and camphor, combined with the treatment of the causative seborrhœa, the best treatment for prickly heat.

CONCLUSIONS.

(1) Prickly heat is a staphylococcal infection of the mouths of the sodden sweat ducts.

(2) These staphylococci may be derived from the skin, but more frequently from an existing seborrhœa of the scalp.

(3) The staphylococci of the scalp are strewn all over the body, either by falling from the head or through the agency of clothes and towels.

(4) Excessive perspiration causes the epithelium of the mouths of the sweat ducts to desquamate. This is brought about by excessive exercise or increase in the temperature and humidity.

(5) Rough and warm clothing tend to the extension of the disease, by causing either excessive perspiration or exfoliation of the horny layer.

(6) The staphylococcal infection is best controlled by keeping the skin dry with an antiseptic dusting powder.

(7) The treatment of the primary lesions of the scalp is to prevent the staphylococci from being scattered all over the body.

THE DIAGNOSIS OF TYPHOID-LIKE FEVERS, WITH SPECIAL REFERENCE TO TYPHOID AND KALA-AZAR.

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A few years ago, in temperate climates at any rate, the bacteriological diagnosis of

typhoid fever could be made easily in practically all cases, the result being commonly obtained from culture of the blood, from Widal's agglutination reaction, or both.

In the temperate zone now, with many people inoculated against the three common enteric group organisms, infections are not frequent; when they do occur they are often mild, and their diagnosis is not easy in the event of a positive blood culture not being obtained.

In such countries as Bengal where kala-azar prevails, even with an almost complete absence of protective vaccination against typhoid the diagnosis of a continuous fever requires extended laboratory investigation on account of the especial clinical similarity in many cases between these two infections.

The procedures commonly carried out in this laboratory for arriving at a diagnosis are the following:—

- (1) Culture of the blood.
- (2) Blood serum reactions.
- (3) Cultures of urine and faeces.
- (4) Microscopical examination of the blood.
- (5) Puncture of the spleen, and rarely of the liver.

(1) *Culture of the Blood.*—In the diagnosis of all febrile conditions and their complications this is a most important procedure.

In a recent note in the *Indian Medical Gazette* (1) we referred to its value and cited some results. The technique there described has since been somewhat simplified. Ten cubic centimeters of blood are removed, and seven cubic centimeters of this are put in a tube containing about 10 c.c. of normal saline, with 1 per cent. of sodium citrate. This tube is brought to the laboratory and the major portion is transferred to a flask-containing 50 c.c. of 2 per cent. glucose broth; a small portion is left for culture on N.N.N. medium. The remainder of the blood—about three cubic centimeters—is put in a sterile tube for separation of the serum. This simplified procedure has two advantages; it is not necessary to carry around the flask of easily contaminated medium, and it enables cultures for flagellates and other organisms to be made with the same specimen of blood and from the same tube.

The time elapsing between the taking of the blood and the transfer of the citrated blood to the flask of 2 per cent. glucose broth does not usually exceed half an hour. When the citrated blood has been added to the glucose broth the final dilution of sodium citrate is approximately 0.15 per cent., which is about the optimum advocated by Wright (2) after experiments in cases of sub-acute infective endocarditis. By this method, as we have already shown in our article referred to above, organisms of the typhoid group, streptococci, pneumococci and meningococci

have grown well in blood cultures. Inhibitory delays are infrequent. In most cases the growths have been obtained in 24 hours. Examinations and subcultures are however usually made daily for five days.

(2) *Blood serum reactions.*—There are two which are chiefly employed in our routine:—

(a) The agglutination reaction.

(b) Napier's aldehyde reaction.

The former is carried out according to the method devised by Professor Dreyer and described in the Medical Research Committee's "Bulletin on the Principles and Practice of the Agglutination Test", (No. 51). Its value may be estimated from the attached table where in a series of 208 cases in which a definite diagnosis of kala-azar was made, the Widal agglutination reaction was entirely negative.

Table showing results of agglutination in kala-azar.

Year.	Spleen puncture positive for Leishmania donovani.	Blood culture positive for flagellates.	Aldehyde test definitely positive.	Agglutination Negative.		Agglutination not carried out.
				Dilution 1-25.	Dilution 1-25.	
1922	10		65	23	52	11
1923	17		41	24	23	
1924		15	23	20	18	
1925	2	25	10	—	37	
Total	208	Total	..	208

As a result of our continued observations extending over a period of four years, we place a great deal of reliance on the agglutination reaction and have never found it positive, even in very low dilutions, except in cases of true typhoid infection, present or past, or as a result of a prophylactic vaccination.

Neglect to go carefully enough into the histories of cases would seem to explain the assumption frequently heard expressed that one may find a positive agglutination due to a kala-azar infection.

In our experience of agglutinations done according to the method of Professor Dreyer the typhoid bacillus is not agglutinated even in low dilutions by the serum of normal individuals, nor by that of those suffering from other infections.

While in many cases we have found the agglutination reaction positive as early as the fifth day of disease, it is occasionally delayed and does not appear until as late as the twelfth day.

With regard to the aldehyde test it has been our experience that in all cases in which it has been found definitely positive there was confirmation of kala-azar either in a culture

or spleen smear, or on definite clinical grounds.

(3), (4), (5). The other three laboratory procedures scarcely require extended comments, except to emphasize the necessity in certain cases of repeated and careful cultures of the urine and faeces and microscopical examinations of the blood.

Illustrating some of the difficulties encountered and the value of thorough investigations of all cases along the lines indicated, during the past four years we have had five cases in which a true typhoid fever was followed by the development of kala-azar, and three in which the reverse occurred, and a kala-azar infection while undergoing treatment was complicated by typhoid.

An interesting series came from one institution:—

At about the same time two students came to the Medical College Hospital, one of whom had typhoid fever which was diagnosed by blood culture. This patient died.

The second had a typical typhoid fever which was diagnosed by agglutination tests and later kala-azar supervened, and Leishman-Donovan bodies were found on puncture of the spleen.

Later, a third student was admitted with a primary kala-azar diagnosed by puncture of the spleen, in whose case all examinations for typhoid were negative.

(For Charts *vide* p. 327.)

COMMENTS.

The methods for arriving at a diagnosis in patients with typhoid-like fevers are discussed, and illustrations of the difficulties are cited.

Particular emphasis is laid on methods involving culture of the blood and examination of its serum reactions with special reference to cases of typhoid and kala-azar.

The value of Dreyer's standard method of carrying out the agglutination reaction is noted. It eliminates untrustworthy results, and while requiring care in the preparation of bacterial emulsions and the use of special apparatus, in an institution where many agglutinations have to be carried out, it is, if anything, more expeditious than other methods.

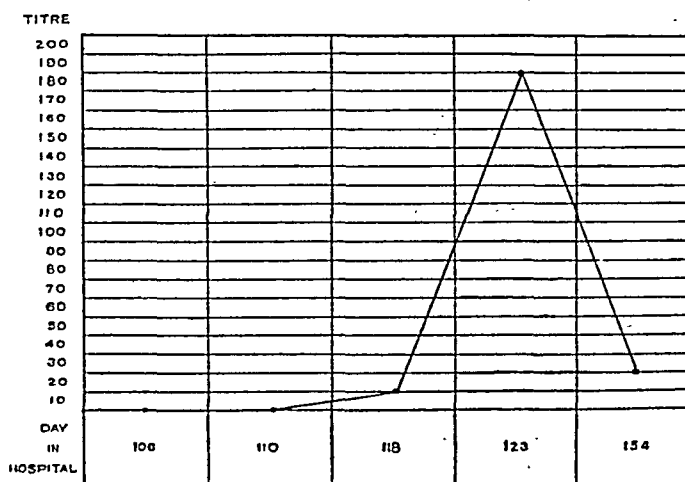
The routine complete examination of cases of typhoid-like fever has brought to light the occurrences of some interesting associations between typhoid and kala-azar. In two of the five cases in which an attack of kala-azar supervened after typhoid it was noted that the agglutinins for *B. typhosus* had disappeared within a short interval. While in certain cases a primary *Leishmania donovani* infection may have an onset clinically resembling that of typhoid fever, followed by an interval and then followed by a further febrile illness, in others there may be a primary true typhoid infection succeeded (after a lapse) by kala-azar. In cases where

the initial febrile attack is diagnosed as typhoid fever by agglutination tests a curve should be sought for, as a low titre might be the residue of some previous infection.

Two temperature charts are shown on p. 327—one, in Charts I and II, of a case in which typhoid fever, diagnosed as such by blood culture, was followed by typical kala-azar which yielded to treatment with antimony. In this case the agglutinins for *B. typhosus* had disappeared when the kala-azar supervened.

The other chart is that of a patient diagnosed as kala-azar by the aldehyde test who, while undergoing treatment, developed typhoid fever as shown by a positive blood culture. This patient's agglutination curve is shown in Chart III.

CHART III.



Agglutination curve of Case II.

Our thanks are due to the Principal of the Medical College for permission to make use of clinical notes and temperature charts.

REFERENCES.

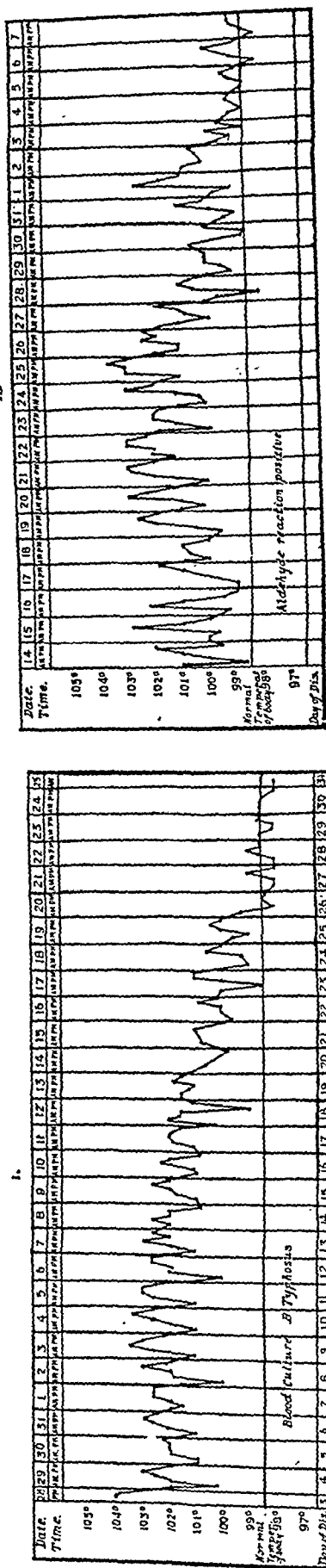
- (1) *Indian Medical Gazette*, Vol. LIX, No. 2, p. 557.
- (2) *Journal of Pathology and Bacteriology*, Vol. XXVIII, No. 4, p. 541.

TUBERCULOSIS IN BENGAL.

By Dr. E. MUIR, M.D., F.R.C.S. (Edin.).

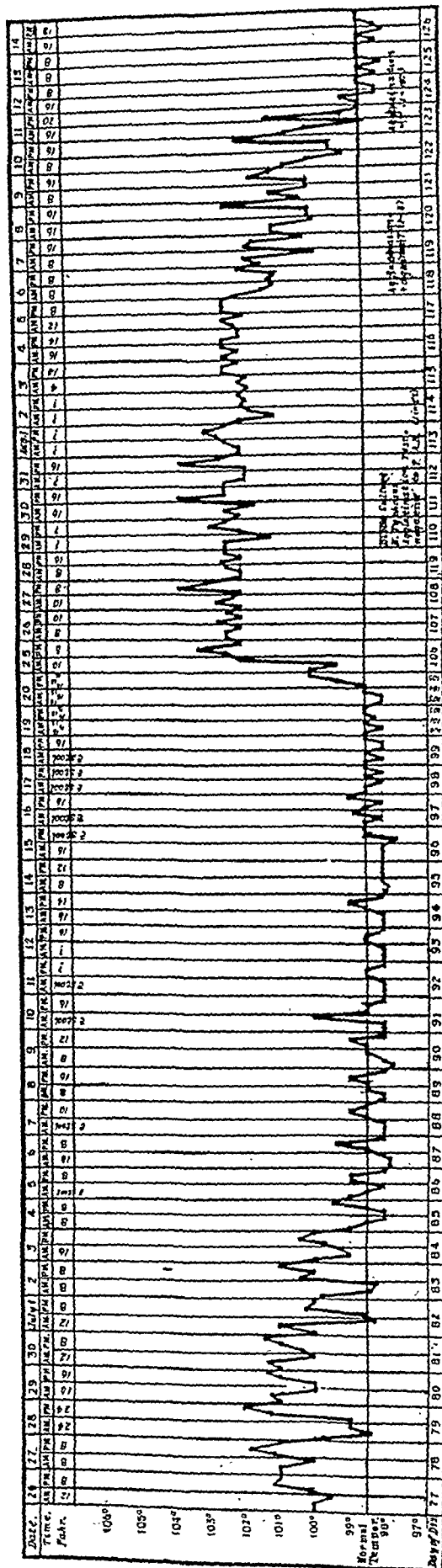
WHILE malaria is the most prevalent and perhaps fatal disease in the country districts of Bengal, tuberculosis is undoubtedly the most fatal disease in the larger towns. The reports of the Health Officer of Calcutta show an average mortality during the years 1919 to 1923 of 2,104 or about 2.3 per thousand of the population. The reports of the Director of Public Health, Bengal, show during the years 1921 to 1924 an average death rate of 0.95 per thousand in the towns of Bengal and 0.037 per thousand in the rural areas of Bengal. These figures point to the conclusion that

CHART I.



Case I. First Admission: Typhoid Fever; Second Admission: Kala-Azar.

CHART II.



Case II. Typhoid Fever developing in Kala-Azar.

tuberculosis is a disease primarily of the large cities, affecting the larger towns to a less extent and still less the villages. The report of the Health Officer of Calcutta shows an appalling death rate among the younger females in the city in the year 1922. The death rate of females from tuberculosis between the ages of fifteen and twenty was 7.2 per thousand, and 7.1 per thousand between the ages of twenty and thirty, as compared with 1.2 and 1.8, respectively in males of the same ages. This means that, if this average is kept up, in passing between the ages of 15 and 30 one out of every ten women in Calcutta dies of this terrible plague. The reasons for this appalling death rate may perhaps best be explained by quoting the Health Officer's words. Speaking of the principal causes of the tuberculosis in Calcutta he says, "Of these the most important is *bad housing*. There are thousands of bedrooms in Calcutta which are not merely ill-lighted and badly ventilated, but which are, for all practical purposes, not ventilated at all. That is to say they are shut in on all sides save one, and frequently the only side that has a door and a window in it opens on to a tiny courtyard. Even if there is a spacious courtyard, the conditions are almost as bad, save that a little more light gets into the room. I find it hopeless to try and convince even educated Indians that such rooms even if well-lighted are insanitary. Now, as I have been pointing out for years, in the case of females the *purdah* system necessarily involves more or less strict seclusion in the worst rooms of the house". To quote from an earlier report "It is difficult to secure absolute privacy in narrow streets and *gullies* without shutting out light and air. The *zenana* is almost invariably in the inner portion of the house, ill-lighted and ill-ventilated but effectually screened against observation. Another important factor in the case of females is *early marriage*, which subjects immature girls to the strain of repeated pregnancies and prolonged periods of lactation. Incidentally I would remark that many of the kitchens in which the ladies of the house spend hours every day are dark dungeon-like cellars full of acrid smoke. With all these factors lowering resistance and predisposing to infection, and many thousands (probably 10,000, if not more) of patients with phthisis *spitting* promiscuously all over the place, one cannot wonder at the prevalence of the 'white-plague' in Calcutta."

There does not appear to be any sign of a definite decrease in the amount of tuberculosis in Calcutta and what is perhaps most serious is the fact that the disease appears to be spreading from the towns and increasing in the rural areas. The figures supplied by the Director of Public Health, Bengal, for 1921 to 1924 are as follows:—

	Rural Areas.		Towns.		Total for Bengal.	
	Deaths.	Rate per mille.	Deaths.	Rate per mille.	Deaths.	Rate per mille.
1921 ..	1,394	0.03	2,661	0.9	4,055	0.1
1922 ..	1,496	0.03	2,981	1.0	4,477	0.1
1923 ..	2,079	0.04	2,863	0.9	4,942	0.1
1924 ..	2,326	0.05	3,251	1.0	5,577	0.1

These figures confirm what has often been noticed, viz., that as communications between the larger towns and the villages improve there is a tendency for tuberculosis to spread from the towns to the villages. To explain this it is necessary to remember that there is an undoubted immunity to tuberculosis produced in endemic areas which is not enjoyed in non-endemic areas. This immunity is formed by numerous small infections beginning from earliest childhood, which gradually render the individual immune, provided that any one dose of infection is not massive enough to overcome the natural or acquired immunity present at the time. In this way young adults living in endemic areas are rendered fairly immune, whereas those coming from a non-endemic area and lacking this immunity are very liable, when they enter a highly endemic area and are exposed to heavy infection, to develop an acute form of the disease. It is well known that this tragedy is being enacted every day in such cities as Calcutta. Young men come from non-endemic villages to Calcutta for education, service or other employment and within a few months or years they show acute signs of the disease. They then return to their villages and spread the infection by means of their bacillus-laden sputum to their own friends and neighbours. In this way tuberculosis is being spread all over Bengal and the other provinces of India.

As new centres of industry are formed and act as fresh distributing centres of *B. tuberculosis* the endemicity is likely to continue to increase, until even the smallest villages become highly endemic areas.

Can anything be done to stem the rising tide of this terrible "white-plague"?

If we take the four causes given by the Calcutta Health Officer, and these are undoubtedly the root causes of tuberculosis, (1) bad housing, (2) careless spitting, (3) poverty, under-feeding and early marriage, and (4) the *purdah* system, can anything be done to remove these causes or any of them? Doubtless numerous prejudices and superstitions are largely at the bottom of all four causes, and it is only by enlightenment of the people that any real improvement can be expected.

In Great Britain the rapid diminution in tuberculosis during the last 50 years has been due (1) to the improved standard of living and better housing, (2) to more care being taken

with regard to sanitation and especially with regard to the spreading of the disease by bacillus-laden sputum, (3) to a greater amount of exercise and fresh air being taken, (4) to the better training of doctors in the early diagnosis and treatment of the disease, and (5) to the establishment of dispensaries and especially of sanatoria and their educational influence on the people.

The efforts which are being made to cope with this terrible disease in Bengal at the present time are not in any way commensurate with the seriousness of the problem. While other provinces have established sanatoria, however inadequate they may be for the real needs of the provinces in which they are situated, Bengal has no special sanatorium for tuberculosis at the present time, although a few hospitals have special tuberculosis wards. It is often asked what is the use of sanatoria when at the most they cannot accommodate more than a very small fraction of the patients. The answer to this question is that, useful as a sanatorium may be in the treatment of the few patients whom it can accommodate, it is much more useful as a centre of education, in spreading the knowledge of the principles which underlie the prevention and treatment of tuberculosis and in educating the medical profession. Tuberculous patients in Bengal who desire sanatorium treatment have at present to go to some distant sanatorium in the Himalayas or South India. What chance is there of a practical demonstration of the right methods of dealing with the disease? Medical students in the Calcutta Medical College seldom see tuberculosis except in the more advanced and hopeless stages, the special tuberculosis ward on the roof of the Medical College being almost entirely filled with advanced and moribund cases. If there were even one sanatorium in Bengal where about 200 patients might be treated in satisfactory climatic conditions and under a whole-time expert who had studied the disease, then we should have a centre of training both for the medical profession and for the laity which would gradually make itself felt. Doctors, who had had a course of training at such a sanatorium, would themselves soon form centres of enlightenment, and small sanatoria would soon spring up on a self-supporting basis as a result of their initiative. A course of training of two weeks' duration for the ordinary medical practitioner and of six months for those who are to act as specialists is what is advised by Dr. Frimodt-Møller of the Madanapalle Sanatorium. One cannot visit such excellent sanatoria as Madanapalle in South India and Dharampore in the Simla Hills without realising not only the vast amount of good being done, but also the much greater good which might be done were these institutions used more as

educational centres. Doubtless Bengal will waken up some time to a sense of its responsibilities in this matter; but surely the case is already so urgent that at least a preliminary effort should be made.

SEVEN-DAY DENGUE IN LUCKNOW.

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DURING the months of September, October and November 1925 the city of Lucknow was visited by a short epidemic of seven-day dengue fever. The first few cases occurred among the nurses at the Lady Kinnaird Hospital at the beginning of September, when about ten of them were confined to bed within the short space of three days. This was followed by a similar outbreak amongst the nurses and students of King George's Hospital. A considerable number of cases also occurred in the city and quite a number of them attended the outpatient department of the latter hospital.

The main characters of the outbreak, as illustrated by the temperature charts given, were as follows:—

(1) *The Fever.* The onset was sudden and usually unaccompanied by shivering. In most cases the temperature came down to normal on the third or fourth day, with general improvement in the condition of the patient. This was so marked that several patients at this stage asked for discharge from hospital, in fact one of the nurses so affected actually resumed duty. In nearly every case, however, the fever shewed a terminal rise on the fifth or sixth day. With only one exception, the cases terminated by crisis, usually on the sixth day.

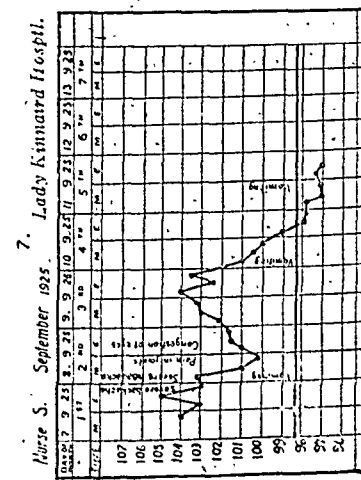
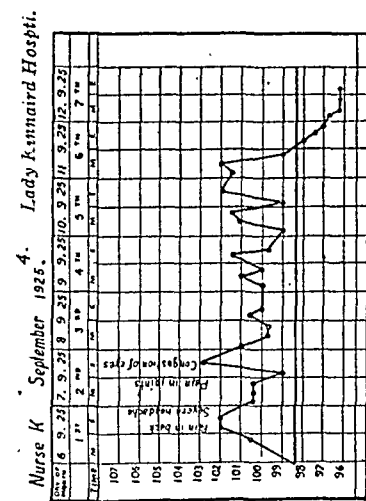
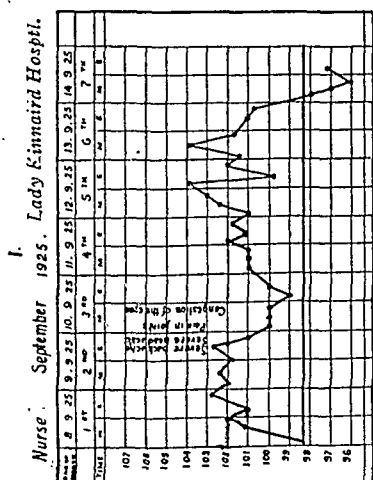
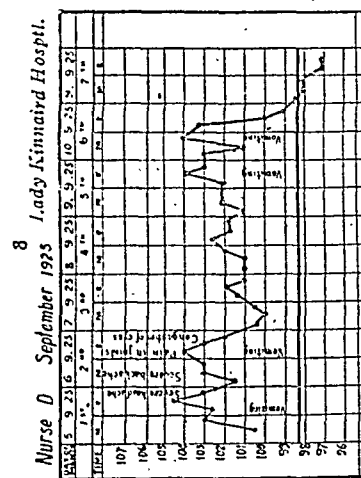
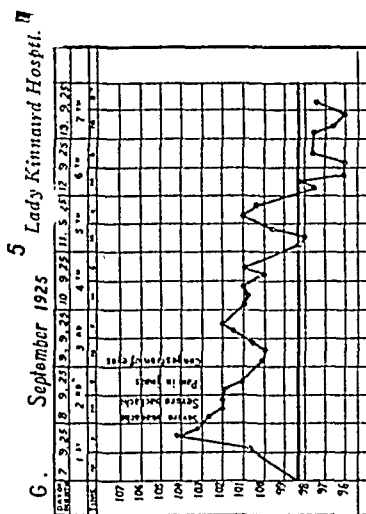
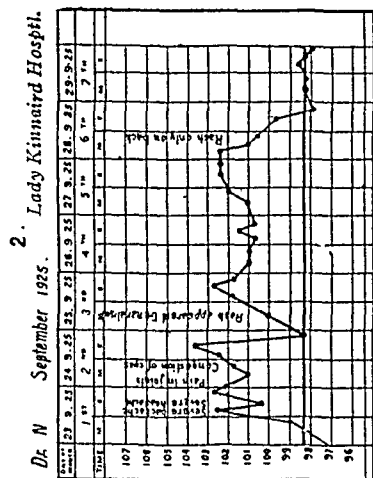
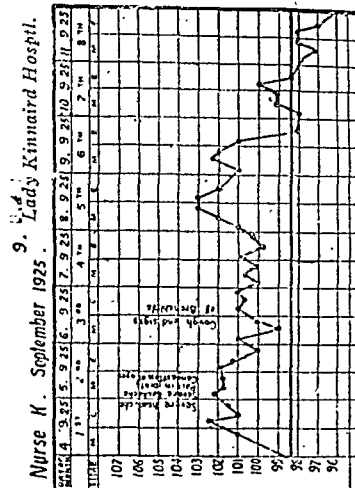
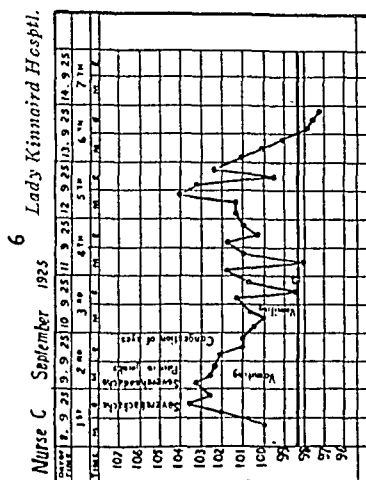
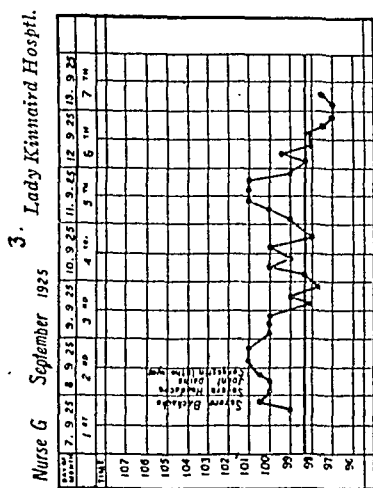
(2) *The Rash.* About 30 per cent. of the cases shewed a generalised scarlatiniform rash on the fifth or sixth day, with the secondary rise of temperature. The rash only lasted for one or two days. As with all rashes it was more marked on fair skins.

(3) *Other Symptoms.* The tongue was clean, a clinical sign of importance in differentiating the fever from typhoid fever. Constipation was a marked feature of nearly every case. Only one case shewed catarrhal symptoms of the naso-respiratory tract. Three cases had vomiting during the fever. The pulse rate was always on the slow side—the average rates being as follows:—

Temperature.	Pulse rate per minute.	
103°F.
102°F. 106
101°F. 103
100°F. 98.6
99°F. 90
98°F. 86
 90

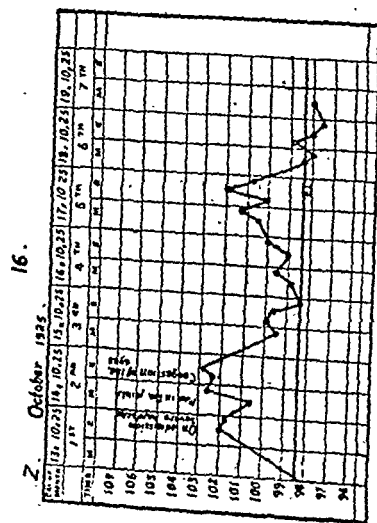
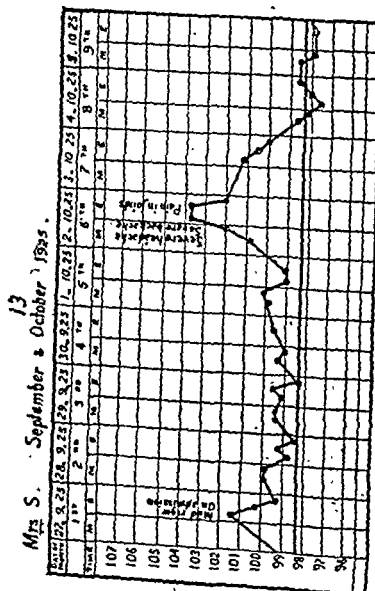
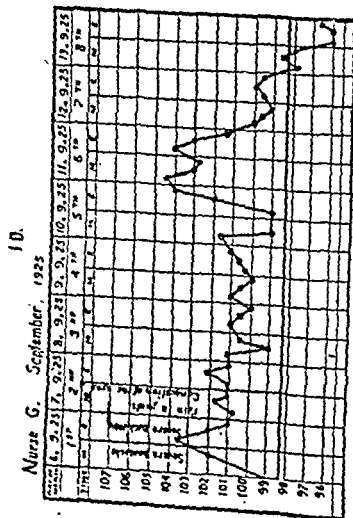
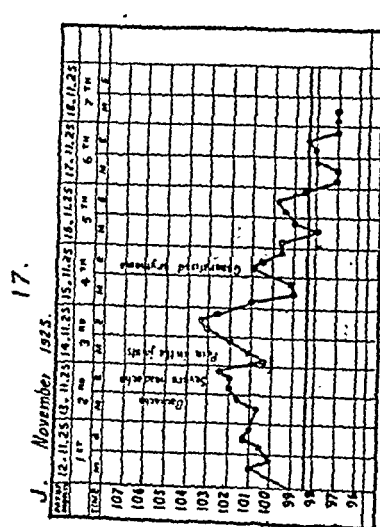
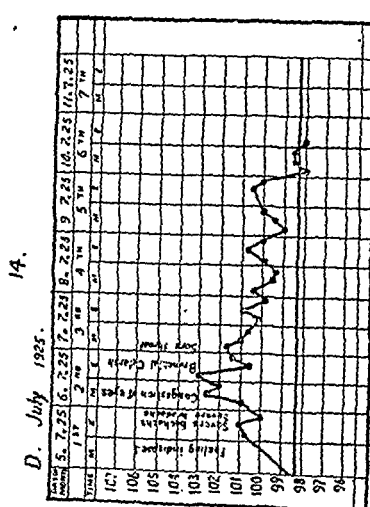
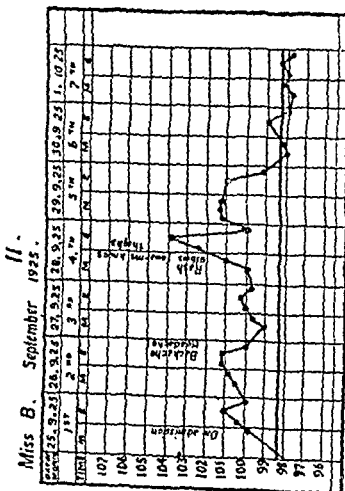
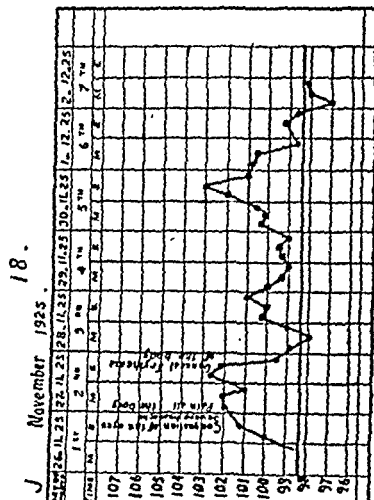
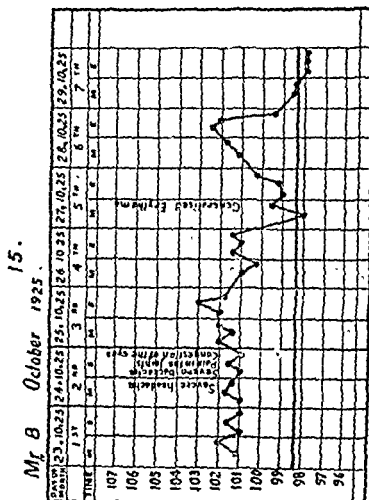
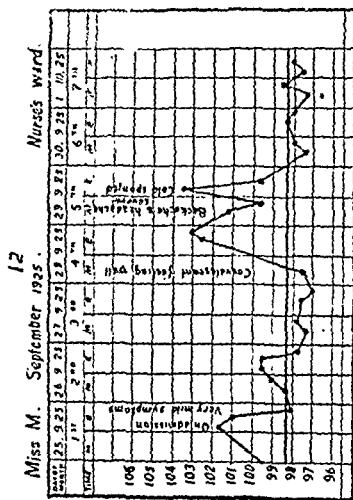
In all cases in which blood examination was carried out malarial parasites were not detected, nor was any definite variation in the differential leucocyte count noted. In some of the cases put on to quinine no effect on the course of the fever was noted.

(4) *The Pains.* Pain in the eyes, deep at the back of the eyeball or a superficial burning and pricking sensation in the conjunctiva was most characteristic and a great diagnostic help during the first two or three days. The conjunctivae, like the skin, were often



swollen, reddened and injected. Pains in the joints and back were at times complained of in individual cases but were not so marked as in the text-book description of "break-bone" fever.

Remarks.
Seven-day dengue is a not infrequent visitor to Lucknow. Epidemics usually occur after the rains, somewhat later perhaps than the early cases of malaria. The incidence of



secondary febrile rises, of rashes, of joint pains varies in individual outbreaks and in individual cases in the same outbreak, but the general clinical picture of the whole outbreak is a clear-cut one. Three-day dengue attacks in the outbreaks were not common,—and certainly not so common as in similar outbreaks of dengue which I have seen in Madras, in Bombay, at sea, and in Mesopotamia. Perhaps this was partly due to the fact that most observed cases were nurses and students, amongst whom temperature records were available from the earliest onset of the fever.

Mosquitoes of all varieties and sandflies were observed during the outbreak, but sandflies were few in number. For this reason it is perhaps more likely that the outbreak was one of mosquito-dengue than of sandfly-dengue, but it is impossible to state this with any certainty.

NOTES ON THE TREATMENT OF BENIGN TERTIAN MALARIA WITH CINCHONA FEBRIFUGE.

By O. A. R. BERKELEY-HILL, M.D.,

MAJOR, I.M.S.,

Medical Superintendent, Ranchi European Mental Hospital, Kanke P. O.

IN an article "On a Standard Treatment for Malaria" published in the *Indian Medical Gazette* (Vol. LIX, No. 4, p. 177), 1924, Major H. W. Acton, I.M.S., and Major R. Knowles, I.M.S., advocate the treatment of malaria,—especially of benign tertian infections,—with a cinchona febrifuge prescription. The measures advocated by these authors are as follows:—

(1) The patient must first be kept off all treatment until the type of infection present has been verified by laboratory findings.

(2) Diagnosis having been confirmed, the patient is then given the following mixture:—

R.

Pulv. cinchona febrifuge (Mungpoo)	grs. x.
Pulv. acidi. citrici	.. grs. xx.
Magnesii sulphatis	.. grs. xxx.
Extracti glycerrhizæ liquidum	.. dr. 1.
Spir. chloroformi	.. m. x.
Aquam ad.	.. oz. 1.

Dose.—For an adult, one ounce is given three times a day, two and a half hours after food, for seven days. The dose is then reduced to one ounce taken twice daily, two and a half hours after food, for a further period of twenty-four days.

(3) The full course of treatment so outlined should be administered *under personal supervision*.

The reasons for this treatment are given in the article quoted, and need not here be repeated. The authors conclude by suggesting that the best way of ascertaining the curative value of this (or of any other) treatment for malaria, would be to try it in hill stations on selected populations—such as troops or the inhabitants of prisons—who are under full control and who can be observed continuously for some months after the cessation of treatment.

The European Mental Hospital at Kanke (Ranchi) affords a good example of such conditions. It is at an altitude of 2,200 feet and, although one cannot absolutely exclude the possibility of natural re-infection from infected mosquitoes, yet there is very little indigenous malaria in Kanke itself. Further, the patients in the hospital are under observation for prolonged periods of months, or sometimes years together.

Accordingly, during 1924 and 1925, all cases of benign tertian malaria which occurred in this mental hospital were treated exactly in accordance with the instructions given in the article by Majors Acton and Knowles. The diagnosis was in every case confirmed by the laboratory findings before treatment was commenced; the full 31-day course of treatment above outlined was scrupulously followed; and the patients were observed for 60 days or longer after the cessation of all treatment.

The results for these two years are shewn in the following table:—

	Males.	Females.	Total.
Cases treated	.. 24	19	43
Relapsed	.. 4	2	6

—giving a total relapse rate of 6 out of 43 cases, or 14 per cent. The patients were all adults.

In two instances, both males, the malaria was experimentally induced for treatment of the mental condition. Notes on these cases are as follows:—

Case 1.—European male adult injected with the blood of a patient whose blood shewed ring forms of *P. vivax*. Malaria followed on the 19th day after inoculation, and parasites were present in the blood films. The patient was allowed to have 8 rigors, after which he was treated with the cinchona febrifuge prescription as above. As the patient was very weak, however, and the infection a very heavy one, two intramuscular injections, each of 5 grains of quinine bihydrochloride, were given. The full month of cinchona treatment was carried out and he did not relapse subsequently.

Case 2.—Male adult treated in the same way. Fever developed 14 days after the injection of the infected blood, and ring forms of *P. vivax* were found in his blood films. He was allowed to have 7 rigors, and was then treated for the full month with the cinchona febrifuge prescription (only). He did not relapse.

With regard to the remaining 41 patients the attacks were all the result of infection by natural channels. It is of course impossible to say what

the previous malarial history of these patients was, and in all probability in every case the attack represents a relapse occurring during the patient's stay at Kanke of benign tertian infection previously acquired in the plains. In all cases *P. vivax* parasites were found in blood films before treatment was commenced.

The average duration of fever after the commencement of treatment was 2 to 3 days in females, and 3 days in the males. Temperatures in general were slightly higher among the males than among the females. In one instance the fever persisted till the 5th day of treatment, and in another till the 7th day of treatment. In two instances parasites were found in blood films up to the 7th day of treatment, but not subsequently.

The following are notes on the cases that relapsed:—

Case 1.—B. R. (durwan). First attack treated by a month's full cinchona treatment. Afebrile from the 7th day onwards. Relapsed 22 days later. Again given a full month's cinchona treatment. The fever of relapse only lasted for 2 days, and no further relapse has occurred.

Case 2.—Mr. R. W. N. (Work Master). First attack, 6-8-24, temperature 105° F. Full month's cinchona treatment; afebrile from the second day. Relapsed on 8-10-24, one month after completing the cinchona febrifuge treatment. Again treated: has had no further relapse.

Case 3.—Mrs. H. First attack on 22-9-24. Full course of treatment completed on 25-10-24. In the first attack the fever lasted 5 days and the temperature never rose beyond 100° F. Parasites were found in the blood up to the 5th day of treatment.

She relapsed on 18-11-24 when she was admitted with a temperature of 102° F. and a heavy infection of *P. vivax* rings in her blood which were found up to 27-11-24.

Cinchona treatment was begun on 18-11-24 up to 8-12-24 and then stopped till 13-12-24 as she was menstruating profusely. It was then recontinued till the 22-12-24 when the full course was completed.

Case 4.—Mrs. C. First attack on 15-9-24. Put on to the full course of cinchona febrifuge treatment; but a relapse occurred whilst she was under treatment on 29-9-24.

Case 5.—Mr. M. S. L. First attack on 28-10-24, temperature 102° F. Put on to cinchona febrifuge treatment, and was afebrile from the 4th day. The full course of treatment was not given, however, as the patient could not retain the mixture.

Relapsed on 6-10-25, temperature 103.4° F. Was again put on to the cinchona febrifuge mixture, and had no more fever. Diarrhoea occurred on the 20th day of treatment, and the treatment was discontinued as the diarrhoea continued, even after omitting the magnesium sulphate from the mixture.

Case 6.—Mr. Q. M. First attack on 15-11-25, temperature 103.6° F. Put on to the full cinchona febrifuge treatment and was afebrile from the second day. Relapsed on 9-1-26, temperature 100° F. Was again put on to the cinchona febrifuge treatment (omitting the magnesium sulphate in the mixture) from 9-1-26 to 15-1-26; but the treatment was discontinued on 16-1-26 as the patient started diarrhoea.

The series of 43 cases here reported is a small one, but it possesses the merit of complying with the conditions laid down by Acton and Knowles as necessary in testing the remedy: the diagnosis was in every instance confirmed in the laboratory

before treatment was instituted, the patients were under personal control and supervision, and they were in residence in the hospital for months after the cessation of treatment.

On the whole, it may be said that the results are good. A cure rate—without relapses—of 86 per cent. in benign tertian malaria is something which is not often seen in hospital practice in India. Further, the mixture possesses some of the advantages claimed for it by Acton and Knowles; it is cheap and it is suitable for mass treatment of malaria. It utilizes all the alkaloids available.

On the other hand, the method has certain disadvantages. Certain patients cannot retain the mixture, no matter how carefully its administration is supervised. In others it tends to cause diarrhoea, even though the magnesium sulphate in it be omitted.

In a recent private communication, Major Knowles informs me that he has also experienced the same disadvantages with the prescription, and that he has now considerably modified the prescription for routine use. The dose of magnesium sulphate in the prescription is too large for continuous administration to some patients, and it should either be reduced for routine use, or modified to suit the individual patient. Some samples of liquorice contain a good deal of tannin, and extract glycyrrhizae liquidum has been omitted from the prescription. Further, Bishop (1924) has advocated the use of syrup simplex (B. P.) in making up the prescription. The extent of lowering of the normal alkali reserve of the body which occurs in malaria has been shewn by Sinton and Baily (1924). The administration of glucose may be of value in malaria in combating this lowering of the alkali reserve. Major Knowles informs me that, accordingly, his routine prescription in out-patients is now as follows:—

R.

Pulv. cinchona febrifuge	grs. x.
Pulv. acidi citrici	.. grs. xx.
Magnesii sulphatis	.. grs. x. ad grs. xv.
Spiriti anisi	.. m. x.
Syrupi simplicis	
Aquam.	.. ā ā oz. i

Dose.—For an adult one oz. three times a day diluted with water, two and a half hours after food, until the patient is continuously afebrile. Thereafter, one oz. twice daily two and a half hours after food, until the patient has received one full month's cinchona treatment.

Whilst this prescription is very suitable for the mass treatment of malaria, and for general use in dispensaries and in out-patient practice; for in-patients in hospital, or for patients who cannot tolerate cinchona febrifuge, 10 grains of quinine sulphate may be substituted for the 10 grains of cinchona febrifuge.

Summary.

(1) Conditions at the Ranchi European Mental Hospital are suitable for experimental investigation of the value of any suggested standard treatment for malaria. There is but little indigenous malaria in Kanke and chances of re-infection by natural channels are small. Full laboratory facilities are available for confirming the diagnosis; the patients are under careful observation and control; whilst they can be observed for months together after the cessation of treatment.

(2) Under such circumstances, 43 patients suffering from benign tertian malaria,—(verified as such in the laboratory)—were treated in 1924-25 at Ranchi with the standard one month's treatment with cinchona febrifuge advocated by Acton and Knowles (1924). Only 6 of these patients relapsed, giving a cure rate of 86 per cent., and a relapse rate of 14 per cent.

(3) These results are very much better than those usually obtained in general hospital practice in India. Yet certain patients cannot tolerate cinchona febrifuge, whilst in others continuous administration of the prescription given tends to cause diarrhoea. A modified formula is accordingly given which may prove to be more suitable.

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"BILIVACCIN-CHOLERA" VERSUS COMMERCIAL CHOLERA VACCINE.

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ABOUT a year ago the agents for "Bilivaccins" in India submitted some hundreds of doses of their preparations to be tested in the laboratory of the Calcutta School of Tropical Medicine. These preparations are asserted to confer lasting immunity against cholera, dysentery and other intestinal diseases when taken by the mouth. Cholera and dysentery "Bilivaccins" were specially tested on experimental animals and a preliminary report on the following lines was issued to the agents:—

1. Cholera "Bilivaccin" and dysentery (Shiga) "Bilivaccin" given by the mouth protect rabbits against lethal doses of these respective organisms when given intravenously.

2. Protection to any appreciable extent does

not appear before the end of the second week after the last dose of the Bilivaccin.

3. Rabbits receiving half the adult human dose of cholera "Bilivaccin" after a 14 days' interval can tolerate at least two minimum lethal doses of living cholera virus when administered intravenously.

The above remarks with regard to the cholera Bilivaccin were based on two series of experiments done on rabbits, details of which are given below:—

Series I. The Preliminary Experiments.

In this series the rabbits were fed on half doses of Bilivaccin-cholera and estimated lethal doses of living cholera vibrios were injected at different intervals to ascertain if any protection had been acquired by the animals as the result of oral vaccination, and if so how long after the completion of a course of vaccination did resistance develop.

	Date of completion of oral vaccination against cholera.	Date on which the protection was tested.	The amount of lethal dose of a standard cholera vibrio given.	Result after 24 hours.
1. Rabbit No. 1 ..	8-2-24	24-3-24	2 M.L.D.	Alive
2. Rabbit No. 4 ..	28-2-24	5-4-24	3 M.L.D.	Died
3. Rabbit No. 10 ..	14-4-24	23-4-24	2 M.L.D.	Died
4. Rabbit No. 11 ..	12-5-24	3-6-24	2.5 M.L.D.	Alive
5. Rabbit No. 12 ..	12-5-24	7-6-24	3 M.L.D.	Died
6. Rabbit No. 23 ..	19-7-24	7-8-24	More than 2 M.L.D.	Alive
7. Rabbit No. 21 ..	8-7-24	..	..	Died
8. Rabbit No. 22 ..	19-7-24	..	..	Died

ABSTRACT.

2 died of natural causes before the experiment was completed.

1 died with 2 M. L. D's. given on the 9th day after the last dose of vaccine.

1 died with 3 M. L. D's. given on the 26th day after the last dose of vaccine.

1 died with 3 M. L. D's. given on the 36th day after the last dose of vaccine.

3 survived with 2 M. L. D's. given on the 44th, 22nd and 19th day, respectively, after the last dose of vaccine.

Series II.

This series was carried out to confirm the results in Series I.

The experiments were started with 26 animals, including the controls. Only 7 outlived the observation period. The majority of them died from natural causes or accidents during feeding.

		Date of completion of a course of oral vaccination against cholera.	Date on which the protection was tested.	The amount of lethal dose of a standard cholera vibrio given.	Result after 24 hours.	REMARKS.
1. Rabbit No. 11	25-10-24	12-11-24	2 M. L. D's.	Alive ..	Controls.
2. Rabbit No. 19	.. ..	25-10-24	12-11-24	2 M. L. D's.	Alive ..
3. Rabbit No. 36	.. ..	25-10-24	12-11-24	2 M. L. D's.	Alive ..
4. Rabbit No. 7	.. ..	..	12-11-24	2 M. L. D's.	Died
5. Rabbit No. 30	.. ..	..	12-11-24	2 M. L. D's.	Died
6. Rabbit No. 20	25-10-24	26-11-24	1½ M. L. D's.	Alive ..	Control.
7. Rabbit No. 33	.. ..	..	26-11-24	1½ M. L. D's.	Died ..

ABSTRACT.

Three animals survived 2 M. L. D's. given on the 18th day after the last dose of vaccine.

One animal survived 1½ M. L. D's. given on the 32nd day after the last dose of vaccine.

All the control animals died from the lethal doses used for the experiment.

Recently an opportunity arose of testing a brand of commercial cholera vaccine prepared by Messrs. Merck & Co. of Darmstadt intended for subcutaneous inoculation. The results are summarised below:—

1. Physical characters:—A bacterial suspension of uniform opalescence.

2. Numerical equivalent:—This was estimated by Brown's opacity method with the help of the table prepared by Cunningham and Timothy (1). Four bottles were tested and two kept unopened for further reference.

Bacterial contents as stated by Merck = 15,000 millions of vibrios per c.c.

Bacterial contents in several samples, as calculated by Brown's method = 1,500 to 2,500 millions of vibrios per c.c.

The number of organisms per c.c. therefore appeared to vary not only in different bottles but to fall considerably below that stated to be present in the printed slips accompanying the vaccines.

3. Immunising experiments:—Rabbits were immunised with Merck's vaccine as well as with a vaccine of identical opacity prepared in the laboratory from a recently isolated cholera strain. The doses used were the same number of c.c.'s. in both cases; that is to say each animal was given a protective course of vaccine intravenously equivalent to a full adult human immunising dose as mentioned in the printed leaflet supplied by the makers. A week after the last injection one calculated M. L. D. of cholera vibrios was given to each animal by the intravenous route. Both the animals became seriously ill but survived.

CONCLUSION.

The immunising properties of Merck's cholera vaccine compare favourably with those of vaccines prepared locally from fresh cholera strains.

It is to be noted however that a considerable discrepancy was found between the number of bacteria stated to be contained in Merck's vaccine, and that calculated to be present in it by Brown's method.

Although a comparative study of the results obtained by using the two preparations, the Bilivaccin and Merck's cholera vaccine, apparently shows that the former protected more efficiently than the latter, yet no general conclusion can be made on this point for the comparatively poor results of Merck's vaccine may have been due to its low bacterial count.

REFERENCE.

1. Cunningham, J., and Timothy, B., 1924. "A comparison between the numerical content of certain bacterial suspensions obtained by the hæmocytometer method and Brown's opacity tubes." *Indian Jl. of Med. Res.*, 1924, p. 1253.

A TRIAL OF ORAL VACCINATION AGAINST BACILLARY DYSENTERY IN INDIAN JAILS.

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and

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SINCE the enunciation of the idea of conferring local immunity (1) against such intestinal diseases as cholera, dysentery and typhoid fever by Prof. Besredka of the Institut Pasteur, Paris, vaccination by the mouth for protection against such diseases is making steady headway in some European countries and commercial agencies dealing in special biological products in this connection have been opened in all parts of the world. At the request of one of these firms in India we made a preliminary experiment on rabbits with dysentery and cholera "Bilivaccins." The results obtained being definitely encouraging, oral vaccination against dysentery was tried in

certain selected jails in Bengal and Madras Presidencies, not because these jails were particularly bad places for dysentery but because the observations could be properly controlled in such places, and strictly comparable results would be available after some time, as both the treated subjects and untreated controls would be exposed to similar conditions in a common environment.

Two preparations were used for this purpose, viz., (1) Bilivaccin-Shiga consisting mainly of compressed tablets of desiccated bacterial bodies prepared by La Biotherapie of France according to the special formula of Prof. Besredka. (2) A mixed and sterilised emulsion of dysentery bacilli—of both Shiga and Flexner strains—prepared in the laboratory of the School of Tropical Medicine and Hygiene, Calcutta, from strains of organisms isolated locally. The dosage of the emulsion was the same as that used by Nicolle and Conseil (2), in their experiments in Tunis; that is to say 100 milliards of dysentery bacilli for an adult on an empty stomach for 3 consecutive days, no food being allowed by the mouth within 2 hours of ingestion of the vaccine.

The bacillary emulsion was exclusively used in two jails, Bilivaccin tablets in a third, while both emulsion and tablets were tried in a fourth jail. Altogether 1,136 prisoners were treated orally and no unpleasant effects, immediate or remote, were reported in any case and there was no objection on the part of the prisoners to this method of vaccination. Results of the trial are given below:—

(1) Those treated with the mixed bacillary emulsion.

Total number vaccinated	..	627.
Number of cases of dysentery among the vaccinated	..	18.
Percentage of incidence	..	2.88
Total number unvaccinated	..	4,516.
Number of cases of dysentery among the unvaccinated	..	237.
Percentage of incidence	..	5.2

(2) Those treated with "Bilivaccin-dysentery."

Total number vaccinated	..	509.
Number of cases of dysentery among the vaccinated	..	11.
Percentage of incidence	..	2.16
Total number of unvaccinated	..	1,053.
Number of cases of dysentery among the unvaccinated	..	47.
Percentage of incidence	..	4.46

From a consideration of results obtained under (1) and (2) it would appear that the percentage-incidence of dysentery among the vaccinated was appreciably reduced in both cases, but the reduction was more marked when Bilivaccin tablets were used for immunisation. Owing to the high cost of production of dysentery vaccine locally as well as of purchasing Bilivaccin for an extensive and prolonged trial, the investigation has not been continued any further. The results

already obtained, although small for a statistical enquiry of this sort, are highly instructive and call for a wide application of the same principle in fighting cholera which is a much more fatal disease and causes many times more havoc in India than do the dysenteries of bacillary origin.

We are much indebted to the superintendents of the jails concerned, especially to Captain B. G. Mallya, I.M.S., and Dr. Duckworth of the Jail Department, Bengal, for allowing facilities for research work in their respective jails and for keeping careful records of observations in this connection.

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2. Nicolle and E. Conseil, 1922. "Vaccination preventive per voi digestive chez l'homme dans la dysenterie bacillaire et la fièvre Méditerranéenne." *Annales de l'Institut Pasteur*, XXXVI, No. 8.

A NOTE ON AN EPIDEMIC OF FOOD POISONING IN MULTAN CITY (PUNJAB).

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ON the morning of the 12th May, 1926, I was informed by a sanitary inspector that on the previous day in one *mohalla* of the town about twenty-five persons had shown simultaneously symptoms of cholera, i.e., vomiting, purging and collapse.

I at once visited the *mohalla* and found that all these persons had taken "lassi" (buttermilk), sold by a milk vendor. This milk vendor had hawked his "lassi" in the *mohalla* on the 11th instant. On inquiry I found that some cases had occurred in another *mohalla* also, where this vendor had plied his trade. Altogether thirty-two cases came to my notice.

Incubation period.—The symptoms occurred 1½ to 4 hours after taking the "lassi". The length of this period depended upon the amount of "lassi" ingested. Those who took one glass of it fell ill within two hours, and those who ingested less did not show any symptoms till the lapse of four hours.

Quantity ingested to produce symptoms.—Some persons, especially the children, who took only a few drops, also fell ill. This fact shows that the poison, whatever it was, was virulent. As far as I could ascertain, there were only eight persons who had taken the "lassi" and escaped.

Symptoms.—Headache. Half of the cases had headache before the vomiting began.

Vomiting. Vomiting began from 1½ to 4 hours after taking the "lassi". It was very violent and lasted for about eight hours practically in all the cases.

Purging. Vomiting was accompanied by liquid motions, yellowish in colour. Ten was the average number of motions till the relief of symptoms.

Weakness occurred in all the cases just after the beginning of vomiting.

Convulsions and cramps. No case showed these symptoms.

Temperature. No case had any rise of temperature.

Suppression of urine did not occur in any case.

Convalescence.—All the cases, though looking depressed, after twenty-four hours were quite fit otherwise.

Nature of the poison.—I tried to secure a sample of the "lassi" consumed but failed in my efforts. None of the patients had any of it left. The vendor himself, having heard of the cases, disappeared from his shop and could not be found for two days. Meanwhile he had destroyed even his earthen vessel in which this "lassi" was prepared and sold.

Note.—"Lassi" is a sort of buttermilk and is prepared in the following manner:—Some *dahi*, a preparation of milk rich in lactic acid bacilli, is added to the warm milk. The whole of the milk after some hours is converted into *dahi*. This *dahi* is churned and butter extracted from it. The remnant after addition of some water is sold as "lassi." It is supposed to be a cooling drink.

ANTI-MALARIAL OPERATIONS ON THE EASTERN BENGAL RAILWAY— KHULNA BRANCH.

(September 1924 to March 1925.)

By T. H. BISHOP, M.R.C.S. (Eng.), I.R.C.P. (Lond.),
D.P.H. (Durh.),

Chief Medical Officer, Eastern Bengal Railway, Calcutta.

Factors in Malaria Propagation.—In any endeavour to deal successfully with malaria three factors must be considered:—

1. The rapidity of growth and multiplication of the mosquito fostered by insanitary conditions. Whilst the importance of this factor is evident, the cost of putting the railway colonies into such a sanitary state as substantially to reduce mosquito hordes is likely to be very considerable, and unless effective co-operation with outside authorities can be secured much of the benefit which might accrue would be neutralised by the insanitary conditions which exist outside the railway sphere, but still effectively adjacent to railway premises.

The most successful disease prevention campaign (after the Panama Zone control) where the mosquito factor was primarily considered was the campaign instituted by the St. Louis S. W. Railway of the U. S. A., but here not only was a large special staff and adequate funds available but the campaign was designed as a co-operative measure between the railway and the adjacent municipalities.

Since there is evidence that in Bengal some municipalities would be prepared to co-operate in anti-malarial work and the assistance of the

Provincial Department of Public Health could probably be assumed, it is a matter for consideration whether a systematic programme of work on similar lines would not be possible and yield good results.

At the same time there is much that can be done on a small scale to check the growth of the proximate mosquito by attention to conditions in and adjacent to bungalows and compounds, such as searching for and destroying small mosquito breeding places, clearing small patches of undergrowth, removing decaying garbage, etc.

The value of such measures was recognised and special sanitary *jamadars*, trained to discover and deal with such conditions, were engaged and attached to the visiting medical staff—their duties being regarded as both practical and educative.

2. The second factor in malarial propagation is the existence of a large infective focus, viz., the group of persons who harbour one or other varieties of the malarial parasite and "feed" the mosquito carrier.

3. The third factor is the potential infectible group of debilitated and careless persons who, by reason of their habits and conditions of life, render themselves easily liable to infection.

The liability to and disadvantage of partial cure in malaria.—Malaria is peculiarly liable to partial cure and to recurrence (due to non-eradication of the malarial parasite) without reinfection by fresh parasites. Such recurrences follow disturbance of the vital *status quo* such as results from exceptional fatigue, cold or heat, privation, change of residence or diet, etc., whilst other diseases also may induce reactivation of the quiescent parasite and superadd to such affection a recurrent malarial attack. A person who has been partially cured, as has been already pointed out, is a potential transmitter of the disease in addition to being unreliable as regards his ability to perform regular and efficient service.

Distinctive feature of the work.—Since the cost ruled out any attempt at extensive mosquito reduction, the distinctive feature of the work has been to afford thorough eliminative treatment for all cases with the object of lessening the probability of recurrent attacks, and thereby limiting the infective foci to diminish the propagative risk, and, in turn, reduce the number of "primary" cases.

The Campaign, Staff, and Division of Work.—The district in which the "campaign" was conducted is that comprising the 29 stations on the Khulna Branch from Dum-Dum Cantonment on the west to Khulna on the east.

This district was placed in charge of four travelling medical officers, viz., H. K. Banerji, M.B., D. B. Mukerjee, M.B., B. N. Roy, M.B., and K. N. Basu, M.B., who visited each family in railway quarters at least once weekly, made the necessary examinations, and, as far as practicable, assured themselves that the course of treatment laid down was carried out. To assist in the work

amongst the families of the employés the services of Indian nurses were provided.

A fifth medical officer, K. P. Mukerjee, M.B., was established at headquarters for the purpose of making the laboratory tests necessary to confirm and assist the clinical work of the travelling medical workers.

Sanitary *jamadars* were also engaged as previously noted. Hence each medical party consisted of:—

1 medical graduate.

1 Indian nurse, and

1 Instructional sanitary *jamadar*.

Percentage of Railway Population infected.—The Khulna Branch has a railway population of 861 staff and 1,027 dependents or, roughly, a permanent total population of nearly 2,000 persons, more than half of whom were specially treated by the visiting medical officers.

The causes of disease were as follows:—

514 or 27.3 per cent. suffered from primary attacks of malaria.

208 or 11.0 per cent. suffered from recurrent attacks.

52 or 2.7 per cent. suffered from kala-azar.

248 or 13.1 per cent. suffered from (mainly gastro-intestinal) complaints following on pyorrhœa.

6 or 0.3 per cent. from pulmonary tuberculosis: therefore, roughly, 55 per cent. of the railway servants and their dependents were under special observation during sickness and underwent treatment.

Also 241 cases of malaria outside, but adjacent to, railway precincts were also afforded treatment.

"Primary" cases, number of "recurrents," the amount of success and non-success.—For the purpose of this enquiry all persons suffering from malaria when seen first were regarded as "primary" cases as the difficulty of diagnosing previous attacks from the history given by patients would have been insuperable. The main disadvantage of this necessary assumption was that while first attacks of malaria, when properly treated, usually result in cure chronic malaria rarely does.

It was arranged that during the progress of the campaign there should be as few transfers from and to stations in this district as possible and this was adhered to as far as practicable by the railway district officers. We can thus get some idea of the measure of the success and non-success of the policy which was adopted so far as a single season is concerned. Thus of 514 cases of "primary" malaria, 306 were apparently cured and 208 were relapses or reinfections.

Causes of recurrence.—This naturally leads to a consideration of the causes of such relapses and, undoubtedly, the chief factor is the almost insurmountable indifference of the people themselves. The notes of the medical officers are repeatedly punctuated by the remark "failed to continue treatment." It is this mass of unenlightened

callousness which accounts, in the main, for the disappointing results which constantly dog attempts at improvement in the public health. It must be assumed that such elementary facts as the cause of malaria and the advantages of treatment are known to a very large proportion of these railway employés, but the facts, apparently, have not made a sufficient impression or stimulated sufficient self-interest to compel them to embrace the opportunities for freeing themselves from the disease, even when the means for doing so were brought to them and urged on them.

If such a public opinion could be formed regarding the menace which the malaria-infected person is to the community as one finds exists amongst railway employés with regard to the leper (whose infectiousness is not nearly so potent), the eradication of malaria would progress by leaps and bounds. For the present, more and more propaganda is indicated in the hope that eventually the degenerative effect of malaria will be realised sufficiently to stimulate the spirit of self-help.

No better propaganda can be carried out than such an effort as the Khulna campaign, where education and demonstration of the principles of malaria prevention go hand in hand with treatment.

Secondly, it is a fact that "chronic" malaria is not easy to cure and the cure requires fairly prolonged treatment. Many such cases are complicated by other diseases, frequently pyorrhœa, which although so common an affection among the railway staff, is constantly overlooked.

Malarial condition of Railway employés compared.—To realise the malarial condition of the railway population it may be compared to that of the general population of Bengal, and a useful standard for such a comparison is the "fever index" which was suggested by Sir Ronald Ross and represents the percentage of malarial cases to total sick cases treated at hospitals and dispensaries.

The following table gives the comparative "fever index" figures for Bengal province and the railway population for the past five years:—

YEARS.			Bengal.	E. B. Railway.
			Per cent.	Per cent.
1920	..	..	34.8	36.4
1921	..	..	35.4	35.2
1922	..	..	33.1	32.4
1923	..	..	29.6	32.0
1924	..	..	..	28.9

Coming to comparative malarial conditions on the Khulna Branch these are indicated in the following statement which gives the average "fever index" for the districts of Khulna and Jessore

and for the stations on the Khulna Branch which are situated within these two districts.

YEARS.	Average of Khulna district.	Average of Jessore district.	Average of two districts.	Corresponding Khulna branch figures.
				Per cent.
1920 ..	37.2	45.8	41.5	45.5
1921 ..	38.8	46.2	42.5	44.0
1922 ..	36.4	40.5	38.4	37.2
1923 * ..	31.6	39.2	35.4	34.7
1924 ..	..	..	..	32.9

The most hopeful feature of the railway figures is the steady reduction from year to year in the percentage of malaria cases which occur amongst its sick, but comparison with the figures for the province does not indicate much advantage in favour of the railway employé.

Special liability of Railway workers to Malaria.

—It is apparent that in spite of the beneficent influence of better quarters, provision of good water-supplies and the attention of medical and sanitary officials, railway figures as a whole do not indicate that railway workers suffer less from malaria than do the members of the general public.

The chief reason for this is, probably, that railway conditions render the station operating employé peculiarly liable to the disease.

Of the widespread, omnipresent character of the infective material there is sufficient evidence, but beyond this the fact that a necessarily large proportion of the staff do duty at night (when malarial transmission is most active) and are occupied with relieving duty at stations and under circumstances where suitable quarters and regular diet are hard to come by, are additional factors in the increased susceptibility. Night duty is more fatiguing than day duty; it is not possible to invert the natural sequence of day-work and night rest with complete physiological success in spite of long spells of it, whilst the disinclination to take an equivalent amount of rest during day-time as at night leads to a greater draft on the scanty physical reserve which the average railway subordinate and menial possess.

Health of the staff follows sanitary betterment.—The foregoing tables would seem to show that all that might be hoped for in the normal course of working is a gradual but not very considerable improvement in malaria infection amongst the staff, but I think that one of the most valuable results of the Khulna Branch "campaign" has been its clear indication that *considerable improvement does follow sanitary betterment.*

I attach a record of the cases treated at each of the 29 stations on the Branch* and one is first struck by the inequality of the incidence of

infection, e.g., at Khulna the percentage of infected cases to population is 22 per cent.; at Khulna Junction it is 18 per cent.; at Daulatpur, 2½ miles away, it is 58 per cent.; at Phultala, 6 miles distant, it is 19 per cent. and at Bejerdanga, 3 miles eastwards, it is 68 per cent.

It cannot be assumed that special predisposition or those general factors which mainly interest the provincial public health authorities as determining the malarial conditions of the province play a great part where such inequalities occur and we must examine the particular condition of each station as regards the specific factors, viz., extent of the foci of infection, conditions favouring mosquito transmissibility, character of the infectible group to explain the inequality. Contributory will be the prevalence of borrow-pits, insufficient and bad water-supplies, general sanitary uncleanness and disregard of medical aid.

Classification of the stations according to the number of staff employed and resident brings out very distinctly the fact that *in proportion as the staff is more numerous so, as regards malaria, is the station healthier.*

In 18 stations employing a resident staff of less than 15 persons at each station the number of persons who suffered from malaria during the period September 1924—March 1925 was 50 per cent. of the population.

In 6 stations employing a resident staff of 15 to 30 at each station the percentage of population affected was 40 per cent.

In 3 stations employing a staff of 30 to 100 at each station the percentage was 23 per cent.; and in 2 stations in which a staff of more than 100 persons are employed the percentage of malarial cases to population was 16 per cent.

It is impossible to get away from the conclusion that this considerable difference in malarial infection depends on the sanitary state of the stations and is the result of the natural policy that sanitary improvement shall be first provided where it will benefit the greatest number of employés and where earnings warrant the expenditure, but the figures incidentally show how very much worth while such expenditure is.

Sanitary Conditions.—I have appended to this several drawings based on rough sketches made by the visiting medical officers showing the sanitary condition of various stations.

The Khulna Branch of the Railway was built by the Bengal Central Railway Company during the period 1880-84 when the malarial parasite had only just been discovered by Laveran and more than a decade before the theory of transmission through the agency of the mosquito had been established by Ross. The relation of stagnant water and, therefore, of the borrow-pit to the disease was unknown—hence the conditions which at present undoubtedly foster malaria on railways to the detriment of the public health were the outcome of ignorance of what are now well-proved facts.

* Not published.—Editor, I.M.G.

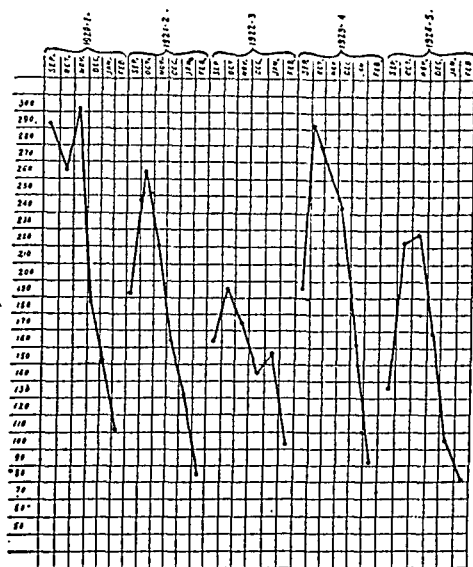
These facts have been known, however, for more than a quarter of a century, but the practical value of them has rarely been more convincingly proved than by the evidence which is here afforded that in stations where sanitary principles are applied (incomplete though this application be) a very great reduction in the malaria incidence follows.

The Malarial Season Campaign.—In order to estimate the work which has been done it must be emphasised once again that it was the intention to treat every case of malaria amongst railway employes and their dependents, instead of dealing only with such persons as might seek assistance voluntarily. It has been stated that it was not possible to secure entire and regular adherence to treatment but the arrangements for visiting the staff made it improbable that any case was missed—hence the figures for the past malarial season represent the actual total number of cases which occurred whilst the figures of former seasons represent the numbers who voluntarily requested treatment from the railway medical staff. With the popularity of the *kaviraj*, the homeopath, patent medicine vendor and the convenient independent medical practitioner, the voluntary patients are certainly not likely to have represented the total number of cases in any previous year.

The figures of the Bongong and Khulna dispensaries show that for the season September—February for—

1920—1921	.. 1,317 diagnosed cases of malaria were treated.
1921—1922	.. 1,056 cases were treated.
1922—1923	.. 941 cases were treated.
1923—1924	.. 1,252 cases were treated.
1924—1925	.. 941 cases were treated.

CHART I.



A graph representing the monthly variation for these seasons is attached, and whilst there is

nothing sufficiently distinctive to lead one to dogmatise, the graph for 1924-25 follows the variation one would expect if the policy of eliminative treatment was proving effective. Providing that this required 6 to 8 weeks to influence the incidence it should control the number of cases in November and bring about a precipitate drop to a lower level than usual. Information is not available yet from the Public Health Department to enable me to compare our figures with the seasonal variation for the Khulna and Jessore districts for the same period, but as far as the entire railway staff is concerned the year terminating on 31st December 1924 showed that 34,146 cases of malaria were treated as against an average of 35,865 for the past 5 years, i.e., up to 31st December, it has proved a lighter malarial season than the average.

It is the intention to carry on this "propaganda-cum-treatment" work for a further period of one year, distributing the special staff (who will now be better able to cope with the conditions and to deal with the operating staff) over the entire system. Arrangements will be made for illustrated lectures on malaria in all railway districts and every other practicable aid to propaganda will be evoked.

The routine treatment has undoubtedly undergone improvement. It was founded upon the researches of Major Acton on the greater value of cinchona bark as an antiperiodic. We have improved on the method of prescribing this and the prescription devised in our "campaign" has been in turn adopted as the most suitable form for routine administration. It is hoped, however, that at least a rough standardisation of the Government cinchona powder will be forthcoming soon.

From the further work I hope for two results:—

1. A better knowledge of the railway staff as a whole as regards infection by malaria.
2. A big step towards the enlightenment of the staff on the propagation and treatment of malaria and the creation of a sense of responsibility in the malaria-infected person in regard to his share in keeping this disease alive.

A Sanitary Decalogue.—From the railway administrative and economical point of view the chief direction in which advance should be made is, undoubtedly, in avoiding the sanitary errors of the past and for this purpose and to add emphasis to the advice which the occurrence of disease so frequently calls forth—I append the following "Sanitary Decalogue":—

1. Do not forget or disregard the effect from the sanitary standpoint of any work that is done in a station, for lack of consideration of this will adversely affect the health of the population.

2. Select and prepare sites for stations, quarters and offices with care since the health of the staff who will inhabit such is of economic value

to the railway as well as of considerable importance to themselves.

3. Do not dump camps of imported coolies in the midst of a colony of railway employes.

allows the introduction of unclean vessels and articles.

5. Make *no kutchra drains* nor yet pucca drains which have neither serviceable beginning nor end,

CHART II.
HRIDAIPUR.

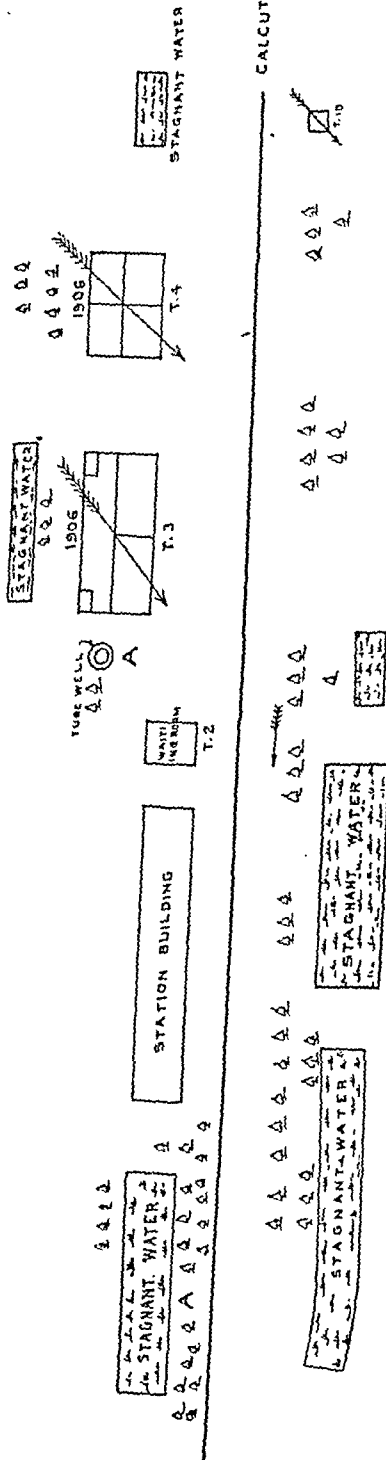
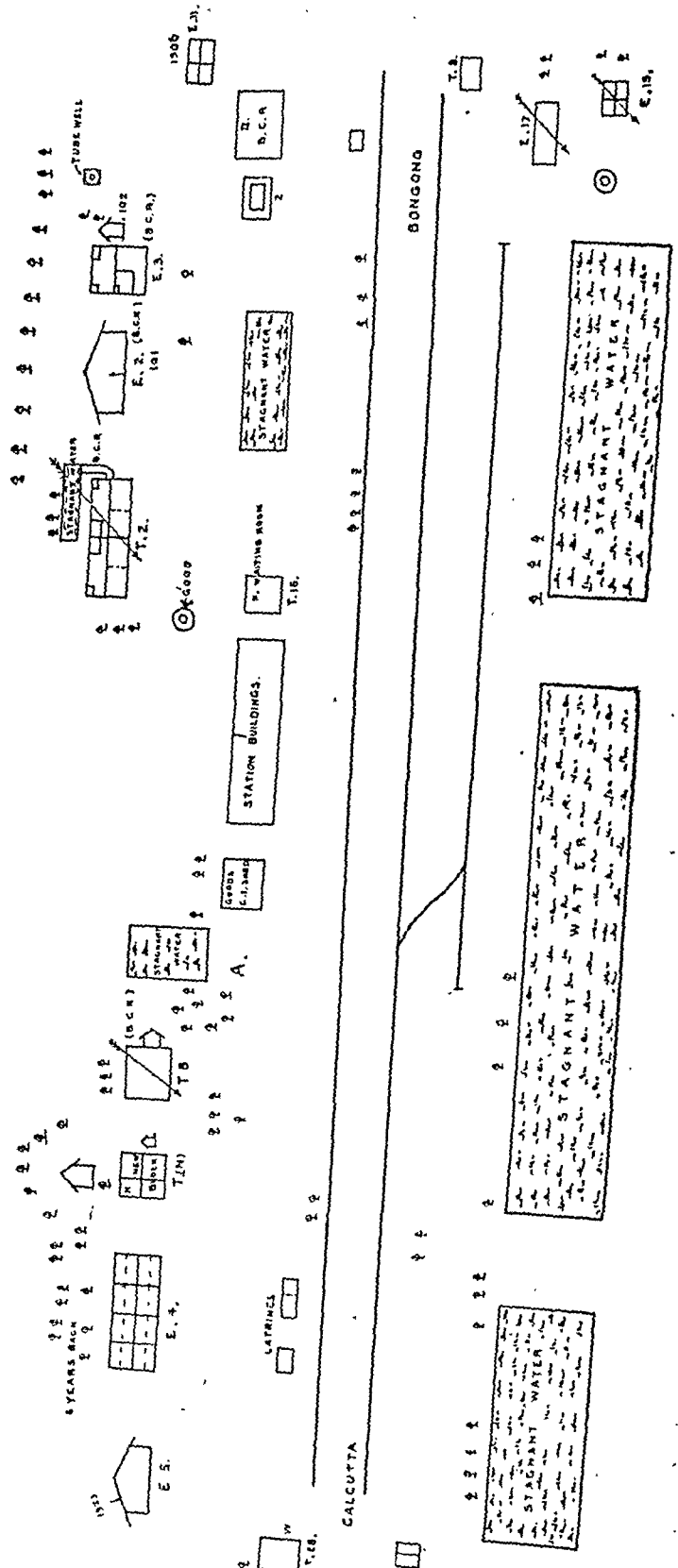


CHART III.
HABRA.



4. Do not introduce an impure water-supply nor one that by carelessness or inadvertence can be rendered impure. Of such is the badly made open well that taps polluted subsoil water or

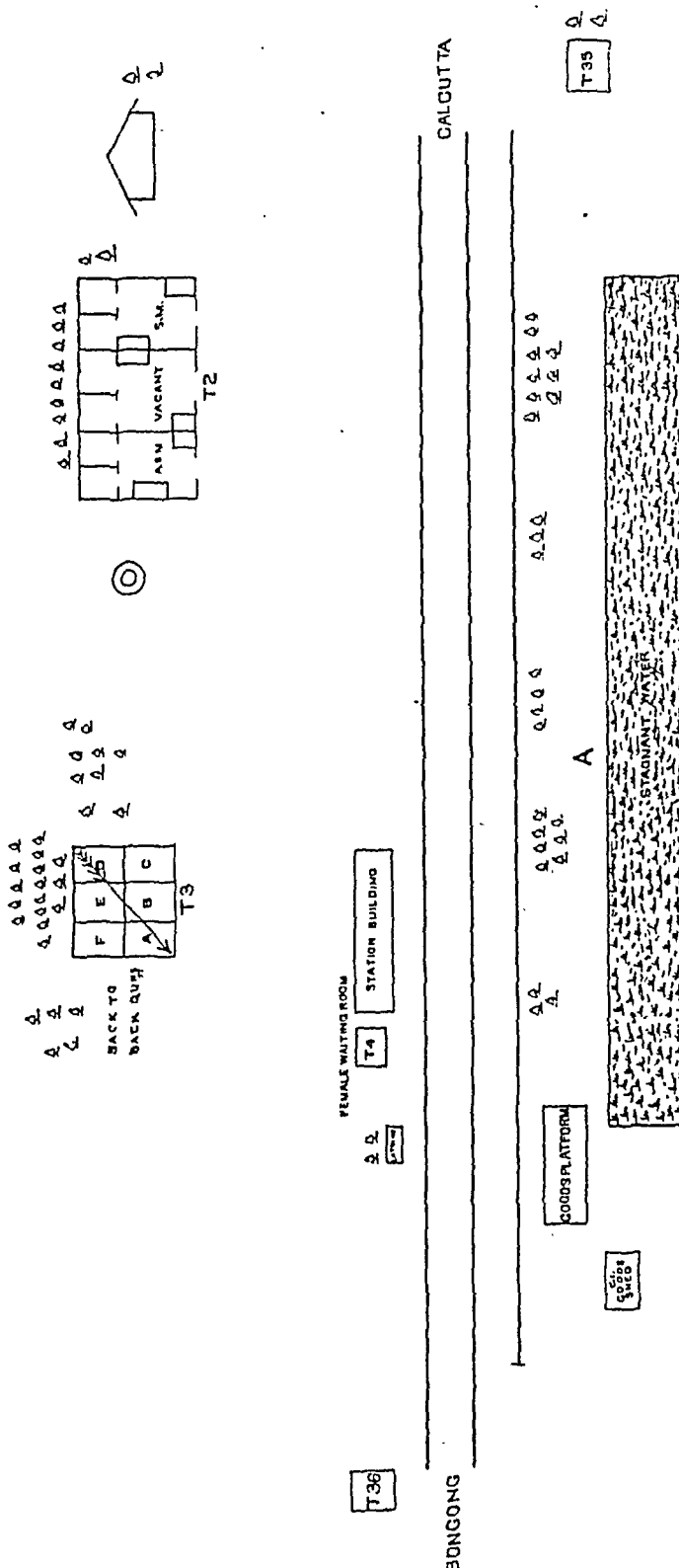
and do not lead water to a place without making arrangements to lead it away.

6. Drainage is necessary to a station but only such drains as are of impervious material, sloped

so as to produce a constant flow and sufficiently large to prevent a stagnant-water-producing overflow should be tolerated. Ill-made and partial drains create swamps which are a sanitary abomination. Also do not make any

or offices which will result in patches of shallow stagnant water. In such mosquitoes breed and mosquitoes are the agents of malaria which is the chief cause of sickness and inefficiency in the staff.

CHART IV.
MASLANDPUR.



borrow-pit or in the process of levelling, plinth-making or dumping produce *relative surface depressions* within the neighbourhood of quarters

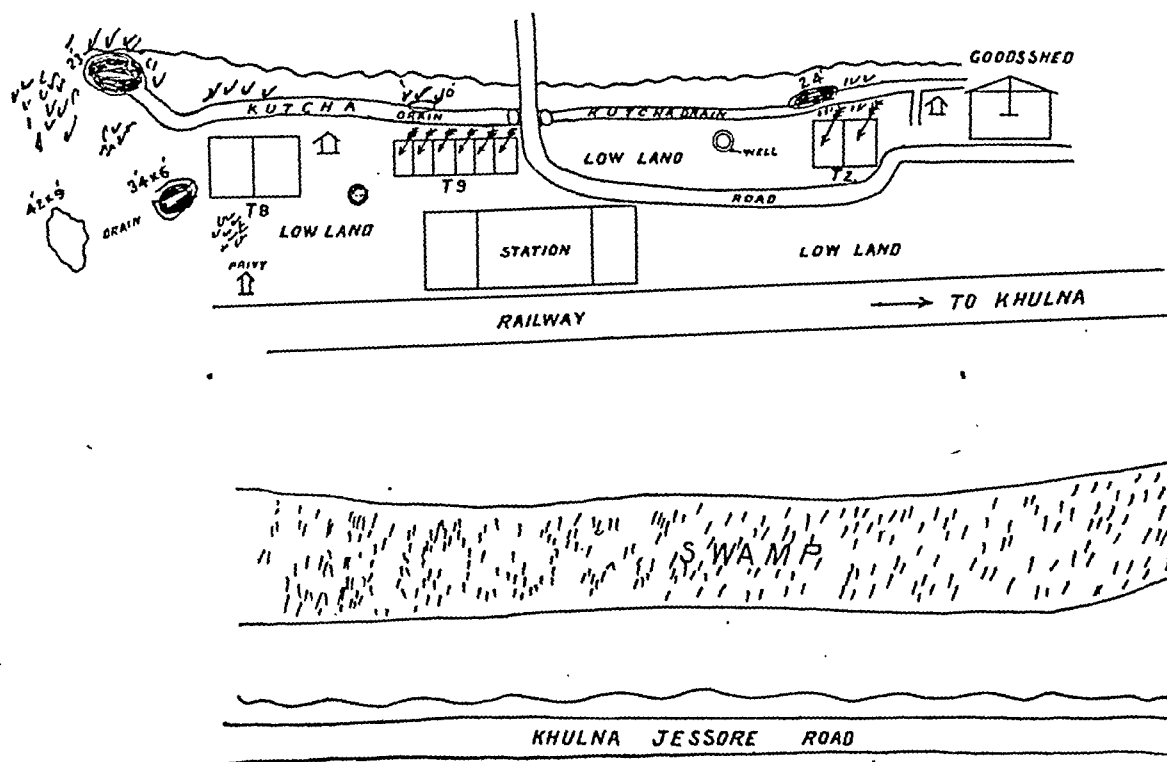
7. It is better to practise than to preach the *principles of ventilation* when providing quarters for the staff. The human body requires

500 cubic feet of space filled with fresh air which should be renewed thrice per hour. Less space than this necessitates draught against which the body rebels. Also the Indian will not tolerate the inquisitive eye: therefore, select site quarters to secure the advantages of ventilation, shade and convenience without tempting a disregard for all three by a preference for privacy.

be provided with one easy access on every side and the remaining banks should be inaccessible.
10. Your every interest demands the highest standard of health in your vicinity. Therefore do all in your power to secure the recognition of the principles of sanitation which are the factors on which depend good health—your own and that of others.

CHART V.

DAULATPUR RAILWAY STATION.



8. Latrines are necessary evils and sanitary staffs are limited—therefore consult the convenience of both user and sweeper in selecting sites and types as far as possible, but the sweeper's by preference.

9. Earth spoil is required in large quantity for station buildings and large, deep bathing tanks are welcome to the staff—therefore take spoil and create the station tank with equal generosity. A bathing tank should have a minimal depth of 4 feet of water and the larger the size the less relatively impure the water. It should

A Mirror of Hospital Practice.

A FEW INTERESTING CASES AT THE WEST HOSPITAL, RAJKOT.

By J. F. HENRIQUES, L.M. & S., B.M.S.,
Officer-in-Charge, West Hospital, Rajkot.

Case 1. Parovarian Cyst.

A HINDU woman, aged 17 years, a nullipara, was admitted to hospital for a tumour in the lower and middle part of the abdomen, extending

up as far as the umbilicus. It was mesially situated, seemed to contain fluid, somewhat lobulated and soft on pressure. There was a history of scanty and painful menstruation.

With the sound the uterus was found displaced to the right side. A provisional diagnosis of some form of cyst was made and the abdomen opened by the Residency Surgeon. A parovarian cyst of the left side containing brownish fluid was found and removed. The ovaries were quite free from disease and were left intact. The patient was discharged cured.

Case 2. A Case of Actinomycosis.

An adult Mohammedan, by occupation a tinsmith, was admitted with an infiltrated tumour of the left cheek with a sinus through which there was a discharge of foul-smelling serous fluid. It was at first thought that the case was one of necrosis of the lower jaw and operation was advised. During operation some broken-down material containing numerous little grain-like masses was discovered. It was subsequently examined microscopically and showed the ray-fungus. The tumour was excised and the cavity touched with pure carbolic acid. Subsequently a necrosed bit of the lower jaw had to be removed. The patient unfortunately had to leave the hospital on account of urgent private work before the wound had healed, but it was looking very well and healthy at the time of his departure.

Case 3. A Foreign Body in the Abdomen.

A Hindu adult was admitted for a fluctuating swelling in the left hypochondriac region. There was no history of injury and his complaint, which began with abdominal distension and indigestion, was of five months' duration. A provisional diagnosis of either abscess due to a carious rib or sub-diaphragmatic abscess was made. On incising the abscess and exploring it, I found a loose object, which on extraction proved to my great surprise to be an Indian tooth brush twig, called in the vernacular "*babul dantan*." It was about 5 inches long and the thickness of a pencil and crushed at one end as the result of mastication when cleaning the teeth. On sending for the relatives who were outside the theatre, and showing them the object, they recollected that the patient had swallowed the brush one morning, when he was still under the effects of the previous night's drinking bout, and had gone to sleep whilst cleaning his teeth. Afterwards he confirmed the story when he came round from the anæsthetic.

The tooth stick had burrowed outwards through the stomach wall. Adhesions around the original opening through the wall of the stomach had formed and prevented escape of the stomach contents.

The external wound healed up and the patient was discharged well.

Case 4. Cocainization of the Urethra after Litholapaxy.

A Hindu patient, aged 74 years, was admitted on 27th March 1926, suffering from stone in the bladder which he said had troubled him for over 30 years.

On examination the stone was found to be a large one and it was thought it might be interesting to have a radiogram taken of it in our recently opened x-ray department.

This was done and showed a rounded stone, the size of a tennis ball.

The following day the stone was crushed by the Residency Surgeon and the fragments, when dried, were found to weigh 6 ozs. 3 drs.

After the stone was removed, according to our present hospital custom, about one c.c. of cocaine solution, of strength 2 per cent. with sodii bicarb. 0.5 c.c. was instilled into the urethra. This seemed to give the patient considerable comfort after the instrumentation which his urethra has suffered and this procedure has often seemed to me to be useful, especially in children.

I have never seen this after-treatment mentioned in connection with litholapaxy and wonder if others employ it.

THE USE OF ESERINE IN EYE CASES: A WARNING.

By HARBANS SINGH, M.B., B.S.,

Civil Hospital, Maimana, Afghanistan.

A PATIENT named Sadr-ud-din, Mahomedan, aged 58, having heard of this hospital as a "sight-restoring" one, attended it one hot afternoon during the fast of the *Ramzan*. (During the *Ramzan* orthodox Mahomedans will touch neither food nor water between sunrise and sunset.) The patient was carrying out this severe fast, and was an elderly man and weak.

He had acute glaucoma, with an exacerbation on when examined. He was quite blind, the pupils dilated and greenish, no pupillary reaction, and tension much increased.

I instilled one drop of a $\frac{1}{2}$ per cent. solution of eserine sulphate into each eye, but without effect. Five minutes later a second drop¹ was instilled into each eye. A minute later the patient complained of his heart giving way. He was bathed in sweat, pupils contracted, pulse rate 25 per minute and very feeble. I put him to bed and with the utmost difficulty persuaded him to break his fast. A dose containing tincture of belladonna, 15 min.; spiritus ammoniæ aromat i dr., in water was given, but without effect. The pulse rate dropped to 20 per minute and the patient's condition was very critical.

I next gave an injection of 1/120 grain of atropine sulphate, but with very little effect. A second similar injection was given immediately

afterwards, and the pulse rate rose to 35 per minute. An inhalation of 3 minims of amyl nitrite brought the pulse rate up to 40, but the patient's condition was still critical. A further injection of atropine sulphate raised the pulse rate to 60 per minute, the sweating stopped, and the pupils dilated a little.

A little cold tea and bread were now given, and the patient slowly recovered. An hour later he was out of danger and I permitted him to go home.

Cases of eserine poisoning in ophthalmological practice must be rare; and it is obvious that the patient's resistance was far below par, owing to his fast. The effect of atropine in saving the patient's life is obvious.

A CASE OF SPONTANEOUS EXPULSION OF A FOREIGN BODY FROM THE LEFT BRONCHUS.

By K. N. PRADHAN,

Mayo Hospital, Nagpur, C. P.

A MAHOMEDAN boy aged 9 was brought to me at 8 p.m. on the 10th January, 1926. He had had a coloured glass bead in his mouth, and it had suddenly slipped into the trachea. His father brought a duplicate of the bead; it was about $\frac{2}{5}$ ths of an inch by $\frac{1}{5}$ th of an inch, and one of some used for ear-rings. Passage of the bead into the trachea was followed by a noisy fit of coughing and pain in the inter-clavicular region, but he took his evening meal well. Stridor however continued.

On examination stridor was present, especially during expiration. Pulse and temperature were normal, and the respiration not particularly increased in rate. Wheezing sounds were heard over both lungs, and a few crepitations on the left side. Nothing was done that evening.

Next day cough and stridor had increased. The child was now examined under an anæsthetic. Laryngoscopic examination failed to shew anything. A bronchoscope was available, but no suitable forceps for removal of the foreign body. Colonel Tarr suggested x-rays, but as the bead was of glass I did not think that any shadow would shew. The child was taken direct from the theatre to the x-ray room, and screening shewed a shadow exactly corresponding to the bead, lying with its sharp narrower end upwards in the left bronchus. The radiologist explained the shadow as being due to the thin coating of metal around the bead.

That afternoon there was slight fever, temperature 102° F., but the stridor had disappeared, and the child was allowed to play. The next day examination of the chest failed to shew any abnormal breath sounds. I explained to the father the "silent interval of Jackson," and told him to bring the child back if there was any fever

or cough. I also sent for suitable forceps for the bronchoscope.

On the 17th March the father returned to hospital. He stated that up to the 16th March the child had seemed to be in fair health, except for occasional spells of coughing. That evening, however, he was seized with severe dyspnoea and a choking cough, and appeared to be about to die; when suddenly the bead was coughed out in the presence of the father. The bead, which was brought for examination, had lost its lustrous coating.

I tried to persuade the father to have the child x-rayed again, but he would not consent. The case is of interest in the long duration of time during which the foreign body remained lodged in the bronchus, and in its spontaneous expulsion by natural means.

INTRAVENOUS IODINE IN A CASE OF PUERPERAL SEPSIS.

By S. R. INGLE,

Medical Officer, Karjat Dispensary, Colaba.

A HINDU woman, aged 20, second para, was admitted to this dispensary on 9th April, 1926, for difficult labour.

Previous labour.—Difficult and prolonged. Breech presentation. Dead child.

Condition on admission.—The patient had been in labour over 60 hours. The bag of waters had ruptured 48 hours previous to her admission to the dispensary. The patient was poorly nourished, not fully developed and weak. Temperature 100° F., pulse 110 p.m. The child's lie was transverse and it was in 1st position, viz., head to the left, back to the front and legs extended and palpable at the fundus. The right shoulder was driven into the pelvis and the corresponding hand had prolapsed out of the vagina with a loop of umbilical cord. The uterus was firmly contracted over the child which was dead.

Operation.—Under chloroform anæsthesia, attempts were made to turn the child and to deliver it as a breech presentation; but this was found to be impossible owing to the contracted condition of the uterus and smallness of the pelvis. Embryotomy was therefore performed and the child extracted. The placenta followed 15 minutes after delivery of the child and 1 c.c. of pituitrin was injected. On examination the vaginal wall and cervix were found bruised and lacerated. A hot lysol douche was administered and the patient put to bed in Fowler's position. There was no postpartum bleeding. Unfortunately no pelvic measurements could be taken for want of a pelvimeter.

9-4-1926. 4 p.m. Temperature 101° F., pulse 120 p.m. The patient was put on to a mixture containing quinine, ergot and strychnine.

10-4-1926. 8 a.m. Temperature 101° F., pulse 124 p.m. and feeble. External parts

swollen and there was much discharge from the vagina. Hot vaginal douche (1 drachm lysol to a pint of water) morning and evening. Quinine and ergot mixture continued.

10-4-1926. 4 p.m. Temperature 102.4° F., pulse as before. Polyvalent antistreptococcal serum, 10 c.c. injected subcutaneously.

11-4-1926. 8 a.m. Temperature 101.4° F., pulse as before. The patient was put on to a mixture containing potassium citrate, ergot and digitalis.

11-4-1926. 4 p.m. Temperature 105° F., pulse 130 p.m. and feeble. Patient delirious. Iodine douche (2 drachms to a pint) morning and evening. Six grains of camphor in 2 c.c. of olive oil injected intramuscularly at 5 p.m., and $\frac{1}{2}$ grain of iodine in 2 c.c. of distilled water given intravenously. Ice bag to the head.

12-4-1926. 8 a.m. Temperature 102.4° F., pulse 120 p.m. Discharge is less offensive. Swelling of external parts subsided.

$\frac{1}{2}$ grain of iodine in 2 c.c. of sterile water intravenously.

13-4-1926. 8 a.m. Temperature 102° F., pulse 130 p.m. and feeble. Six grains of camphor in 2 c.c. of olive oil intramuscularly.

Discharge less. Douche and citrate mixture continued.

$\frac{1}{2}$ grain of iodine in 2 c.c. of water intravenously.

14-4-1926. 8 a.m. Temperature 100° F., pulse 110 p.m. General condition satisfactory. Local lesions much better.

15-4-1926. 8 a.m. Temperature 100° F., pulse 114 p.m. and good.

$\frac{1}{2}$ grain of iodine intravenously.

16-4-1926. 8 a.m. Temperature normal, pulse 104 p.m. Discharge much reduced and had no smell; feeling better.

Local lesions almost healed up except a tear in the cervix which requires repair. Patient was put on to a tonic mixture.

From 16-4-1926 up to the time of writing—(19-4-1926)—the patient has had no fever and is picking up strength. She could not be given more than 10 c.c. of antistreptococcal serum as she was too poor to buy it and it was not available in the dispensary. She was therefore treated with intravenous iodine. There was no reaction after the iodine injections in this case. The solution of iodine used was the following:—

Iodum	..	grs. 6
Potassium iodidi	..	grs. 6
Aqua distillata	..	oz. 1

2 c.c. or 40 minims contain $\frac{1}{2}$ grain of iodine.

Intravenous administration of iodine appears to be a most efficacious remedy in cases of puerperal sepsis. Further, its cost is minimal.

AN ATYPICAL CASE OF DOUBLE HYDROCELE.

By R. V. GAJENDRAGADKAR,

Assistant Surgeon, Civil Hospital, Osmanabad, Sholapur District, H. E. the Nizam's Dominions.

THE photograph sent herewith is that of a Hindu male patient of the clerical class, 45 years of age, who was admitted to this hospital for the radical cure of his hydrocele on the 7th January 1926.

The hydrocele had been present since childhood, and was formerly about the size of a lemon; during the past three years, however, it had grown enormously. On examination there was found to be a huge, double-loculated hydrocele on the left side with no hernia; it was about 18" in length and 12" in breadth. On the right side there was also a hydrocele of small size. The penis was buried in the fold of the tumour as shewn in the photograph.

Operation.—An incision 8" in length was made, and the tunica vaginalis separated from the tunica albuginea. The tumour was then tapped, some 3 to 4 lbs. of clear serous fluid being collected in a sterile bottle. The whole tumour was then shelled out, the redundant portion of the tunica albuginea clipped away, and it was then turned back and sutured. The skin incision was sutured and a small gauze drain inserted. The wound healed by first intention; operation was performed on the 7th January and the patient was discharged on the 20th January 1926.



A peculiar feature of the case was the presence within the sac towards the end in which the epididymis lay, of what were apparently small many-sided foreign bodies resembling papaya seeds.

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MALARIA AND NEURO-SYPHILIS.

FREQUENT references have been made in the pages of the *Gazette* to the recent work on the treatment of general paralysis of the insane by malarial inoculations. The subject is discussed in a critical manner in an article in the *Lancet* of February 27th by Professor Warrington Yorke of the Liverpool School of Tropical Medicine. The first part of the paper deals with the technique and results of the treatment, and this part we hope to summarise in Current Topics.

It is the second part of the paper which is of outstanding importance to medical men in the tropics, and though many of our readers may be familiar with the views of Professor Yorke, these call for more than a passing reference. When Dr. Clarke, the Superintendent of the Whittingham Asylum, asked Professor Yorke to infect a number of patients with malaria, the latter welcomed the opportunity of producing and studying the disease under controlled conditions. The first point which he set out to investigate was the remarkable amenability of inoculated malaria to quinine treatment as contrasted with the refractory nature of the disease when encountered in war practice and in civil life.

Wagner Jauregg believed that malaria contracted by blood inoculation from another patient was more easily cured than malaria contracted by the bite of an infected mosquito. To test this point Yorke infected about 50 patients by the bites of infected mosquitoes, he allowed the patients to have about ten paroxysms of malaria and then treated them by giving 30 grains of quinine daily for three days. This treatment definitely cured 43 per cent. of the cases, while nearly all of the remaining 57 per cent. had only one relapse between four and eleven months later. In the vast majority of the relapsing cases the disease disappeared spontaneously or was cured by another three days' course of quinine. It thus appears that benign tertian malaria induced by the experimental bite of infected mosquitoes and treated within a short time of the onset of the disease responded to a treatment which we are in the habit of regarding as utterly insufficient.

This experience is decidedly puzzling and it is interesting to note the conclusions which have been reached by Professor Yorke. These are:—

(1) Provided that a minimal dose of quinine be given (20 to 30 grains daily) for two or three days, the amount of the drug given exercises no influence. Larger doses do not give better results.

(2) The period of the year exercises no influence.

(3) The strain of *Plasmodium vivax* does not matter.

(4) The factor which governs relapse is the patient himself.

The cases which were so readily controlled by quinine were recently infected and previously untreated, while the refractory cases on record were old-standing relapse cases. Yorke discusses the mechanism of cure in malaria; he believes that quinine, either directly or more probably indirectly, destroys a considerable number of the malaria parasites and thereby an antigen is set free which stimulates the body to produce antibodies by which more parasites are destroyed.

Two processes are involved, the first is the destructive action of quinine on the majority of the parasites, the second is the reaction of the body to the antigen which is set free when the parasites are destroyed.

Quinine in no case is able to destroy all the parasites, those that escape are held in check by immune bodies and a state of balance results. This ends either in the dying out of the infection or in relapse.

It is quite clear that Yorke regards over-dosage with quinine as being responsible for lowering the resistance of the patients by exhausting the body cells which react with the drug to form an anti-parasitocidal substance. He therefore suggests that the repeated relapses seen during the war and in civil life are due to over-treatment with quinine. He does not explicitly say so, but the suggestion underlying the article is that the proper treatment of recent benign tertian malaria is by a course of three days' treatment, followed by the complete withholding of the drug unless a relapse follows, in which case a further course of three days' treatment is sufficient.

Should this method of treatment be found to give better results than the orthodox prolonged course of quinine, it will certainly be popular, both with doctors and patients. It might have been better to put this matter to a crucial test before basing such far-reaching recommendations on experiments which are capable of other interpretations. The following questions suggest themselves:—

(1) What reason is there to believe that the action of quinine is so complicated as is suggested by Professor Yorke? If the drug, directly or indirectly, has a parasitocidal action on certain parasites, what reason is there to believe that the other parasites are not affected by quinine, but are affected by antibodies formed in response to the production of antigens? Is it not possible that all the asexual parasites which are present in the blood stream are liable to destruction by quinine, and that the failure to cure is due to the fact that some parasites have found their way to by-passes of the body fluids in which they are not easily reached by the blood stream which carries the quinine? Another

possible explanation of relapse is the parthenogenetic reproduction of sexual parasites which are notoriously resistant to quinine; this is still a controversial question on which it is not necessary to linger.

(2) Has it been shown that the cases of malaria in which repeated relapses have occurred have been those in which large doses of quinine have been given?

Comparatively few cases of malaria are thoroughly treated from the beginning, and it would appear to be likely that thousands of patients have been treated by just such courses of quinine as have given such excellent results in artificially produced malaria. Why then have all those who have had the greatest experience in the treatment of malaria laid special stress on the need for prolonged quinine treatment instead of the courses of a few days which are now suggested as being the ideal? It would be interesting if Professor Yorke or others were to treat some of their experimental cases with the orthodox standard courses of quinine and find out whether many of them suffer from persistent relapses. Such evidence would be very valuable.

The experiment which consists in treating recent cases of naturally acquired benign tertian malaria by three-day courses of quinine will doubtless be carried out by many; if selected cases can be secured within a few days of the onset of benign tertian malaria, and if these are found to respond in the same way as the artificially infected cases the results will be of great value as evidence. It is true that comparatively few medical men in the tropics have many opportunities for such experiments, but the subject is one of such importance that it is most desirable that carefully controlled experiments on these lines should be carried out. To make them complete it would be necessary (1) to have a supply of recently acquired cases of benign tertian malaria; (2) to remove the patients to a place which is free from malaria; (3) to treat some of them with quinine in the orthodox way; to treat others with short courses such as were used by Professor Yorke after allowing them to have ten paroxysms before treatment is started; a third group would be treated as early as possible after the appearance of the fever. If a considerable number of recent infections could be treated in each of these three ways we should then be in a position to lay down rules for the treatment of recently acquired infections, but we should still be faced with the old problem of what to do with the cases in which relapses have occurred before the patients have fallen into our hands.

We must confess to having some misgivings as to the results which will follow on the universal adoption of the three-day courses of quinine which are suggested as being the most scientific method of treating malaria, and we hope that the enthusiastic acceptance of the wide implications which are contained in Professor Yorke's fascinating study will not lead to disappointment.

One of Professor Yorke's findings appears to be capable of immediate acceptance, viz., that quinine will inevitably fail when employed as a prophylactic, but it by no means follows that what has loosely been called "quinine prophylaxis" is also a failure. There is a great body of evidence that the regular administration of quinine in places where intense malaria prevails is most valuable in lessening the number of attacks and in preventing the occurrence of dangerous forms of the disease. It would be unfortunate if the discovery that quinine is useless as a prophylactic should be interpreted as meaning that early mass treatment of the disease is also foredoomed to failure.

It may savour of vain repetition to insist on the many fallacies which attend the administration of quinine, for the past twenty years the writer has emphasised the importance of being certain that the quinine has actually been swallowed, and his experience has invariably been that if quinine does not produce its usual effects in cases of malaria, the drug has not been properly administered; either the patient has evaded the drug or the compounder has stolen part of the quinine and made up a mixture which is much below the proper strength, or the quinine has been given in an insoluble form. We often read articles dealing with the "failure" of quinine; in these it is usually stated that such and such doses were given. When quinine fails in my hands I feel that there are two alternatives, the one is that the drug for some remarkable reason is behaving in an exceedingly unusual manner, the other is that there is some fallacy in the administration. In every case in which it has been possible to put the matter to a thorough test I have found that the quinine has not failed, it has not been given properly.

To those who have not had wide experience of the wickedness of patients and compounders it may seem incredible that such things should occur, the fact remains that in all the cases in which quinine has been given in the Carmichael Hospital for Tropical Diseases I have only seen two in which it has not acted in a thoroughly satisfactory manner when given in solution by the mouth. In both of these cases the stock mixture was analysed and was found to be of less than half the proper strength. If such a thing can happen in a hospital in which it is well-known that the failure of quinine is invariably made the subject of a strict enquiry, what is likely to happen in places where the failure of the drug is regarded as a commonplace occurrence?

To my mind the conflicting evidence which exists regarding the value of quinine by the mouth both in treatment and in prevention is best explained in the light of the many proved cases in which the drug has not been administered in the doses which have been ordered.

In my experience the only safe rule to follow is to regard the failure of quinine in the same

way as the occurrence of sepsis after an operation which has been supposed to be aseptic. In both cases a failure of technique should be suspected and looked for. Only thus will the standard of success in treatment be maintained at its proper level.

Professor Yorke is to be congratulated on the valuable contributions which he has made to our knowledge of the treatment of malaria. He has shown what happens under certain experimental conditions: it remains to be seen whether his experiences will be reproduced in the cases of malaria which occur in the practice of physicians who work in malarious countries. We earnestly hope that such will be the case, but we would suggest the exercise of caution before discarding the orthodox methods of treatment which have given such satisfactory results in practice.

J. W. D. M.

SPECIAL ARTICLE.

THE SIXTH CONGRESS OF THE FAR EASTERN ASSOCIATION OF TROPICAL MEDICINE.

By J. W. D. MEGAW, C.I.E.,
LIEUTENANT-COLONEL, I.M.S.,

Delegate from the Government of Bengal.

In an editorial in the February number of this *Gazette* some of the social and general aspects of this Congress were dealt with. A brief survey will be made in this note of some of the problems which were discussed.

The most striking feature of the Congress from the scientific point of view was the great number and variety of the papers which were presented, especially by the Japanese workers. To some extent the very multitude of the papers was a drawback, sometimes it was not possible to see the wood for the trees, and a very definite impression was conveyed that it would have been better to have weeded out a number of the less important contributions and to have restricted the scope of the Congress to tropical diseases. If only the more valuable contributions by Japanese and other workers had been accepted, discussion of excellence would have been maintained. On the other hand the policy of the censors of the papers evidently was to encourage the self-expression of the younger workers to the greatest possible extent, and when we consider the very large number of Japanese who are actively engaged in medical research, the number of the papers is not relatively very large.

The problem to which greatest attention was paid was beriberi, and this disease was dealt with both at the opening full-dress meeting and at many of the sectional meetings. Beriberi is a great and increasing problem in Japan, and the variety of views which were brought forward

indicates that there is no illusion on the part of the Japanese workers that the problem has been solved. There seemed to be just as many who were dissatisfied with the orthodox vitamin deficiency view as of those who declared their adherence to that view, but practically all were in agreement that vitamin deficiency plays an important part in causing the diseases which are grouped together as beriberi.

The medical committee on beriberi which has been in existence from the early days of the Congress adopted resolutions which are much broader, much less definite and much less open to criticism than the earlier dogmatic resolutions which called for immediate legislation for the control of beriberi. The earlier resolutions stated as a dogma that beriberi could and would be controlled by the prohibition of the use of over-milled rice. The resolution at the last Congress still emphasised the importance of promoting the preparation of rice in such a way as to retain the important vitamin B. and the other nutritious substances which are lost in the process of over-milling, but it did not call for hasty legislation and it emphasised the importance of storage of rice, a point on which we in Calcutta have been laying stress for a good many years. It also insisted on the need for further study of the disease, and altogether—while it suffered from a certain degree of lack of definition in its aims and from an absence of dogmatism—it was marked by a scientific caution which will probably be found to be a more proper attitude than was the case in some of the previous resolutions. It was recognised that a demand for immediate legislation was not justified in the present state of our knowledge, and judging by the amount of work which is being carried on by competent experts in Japan, it is likely that important developments will take place in the near future on the very important group of diseases which has been included under the old name beriberi or *kakke*.

The discussion on beriberi was opened by Dr. Fujinami of the Kyoto University who gave a resumé of the history of research into the disease, and concluded by saying that further investigation was needed, that the infection and intoxication views were not dead and that vitamin deficiency did not explain everything.

Professor T. Ogata of the Tokyo Imperial University read a paper in German on the "Non-identity of vitamin B. deficiency disease and beriberi." Dr. Ogata had already discussed the differences between these two diseases in a paper in the *Japan Medical World* in 1924. He brought forward further evidence as to the difference between the two diseases. He stated that undue importance had been attached to the nerve disorders in polyneuritis gallinarum in which disease the neuritic stage appears towards the end of the disease when the fowl is on the point of death. He said that in avitaminosis B. the central nervous system is seriously affected, while in

beriberi the disease attacks mainly the peripheral nerves.

He had also proved experimentally that the quantity of vitamine B. contained in the corpses of beriberi victims was not different from that contained in the corpses of persons who died of other diseases. Dr. U. Suzuki read a paper in which he told how he had anticipated Funk's work on vitamine B. by the preparation of oryzanin a year previously to Funk's publication.

Professor J. Shimazono of the Tokyo Imperial University, briefly dealt with the various views as to the causation of the disease. He said that Sakaki in 1892 held that a mould formed on rice produced in certain provinces was toxic and caused beriberi. Takagi was the first scientist to suggest diet deficiency as the cause, he was responsible for the excellent results obtained in the Japanese Navy by giving a diet richer in protein and thus he produced evidence that protein deficiency played an important part.

He referred to the resolution adopted by the Third Congress of the Far Eastern Association of Tropical Medicine in 1913 in which the dogmatic statement was made that "beriberi is caused by a deficiency in the diet of certain substances which are present in sufficient quantity in unpolished rice." Many Japanese scientists at the time did not accept this conclusion.

He next dealt with some points in which human beriberi differs from the experimental deficiency disease of animals such as:—

(1) In human beriberi the diet contains other accessory foods besides polished rice.

(2) In beriberi there is no marked reduction of weight.

(3) There is no marked circulatory disturbance in the deficiency diseases of animals.

(4) There is a pronounced seasonal prevalence of beriberi. In Japan the infectious and intoxication views are held by very few workers to-day, but some of them strongly hold that there is some other factor besides vitamine deficiency.

Professor Shimazono expressed himself as being in agreement with the view expressed by Megaw in the Transactions of the Far Eastern Association of Tropical Medicine of 1923 that "the medical profession appears to have accepted too readily a view of beriberi which has not been established on a sound basis and which is inconsistent with many observed facts. I feel that the greatest obstacle to progress has been the view that the problem of beriberi has already been completely solved."

Professor Shimazono went on to describe his own experimental work, including feeding experiments on human beings using a diet deficient in vitamine B. Persons kept on such a diet developed avitaminosis in about five or more days and the symptoms were similar to those of animal avitaminosis, viz., anorexia followed by paralysis, but no tachycardia or palpitation such as occur in beriberi.

He concludes that the symptoms of beriberi and avitaminosis are very similar though not

quite identical; he refuses to regard the diseases as being one and the same, but at the same time he does not think that they have been proved to be different.

Dr. C. S. de Langen of Java said that beriberi in Java was associated with the use of over-milled imported rice. He stressed the extreme importance of storage of rice and his experience indicated that there is a close correspondence between the conditions of occurrence of beriberi in Java and epidemic dropsy in India.

F. H. Guerin of the Pasteur Institute of Saigon read a lengthy paper on the relationships of the *Bacillus asthenogenes* which he believes to be the cause of beriberi. He brought forward strong evidence that the *Bacillus asthenogenes* is the causal organism, but his position was assailed by Dr. de Langen who pointed out that claims had already been made by the French workers in favour of the same organism as the cause of a short fever.

Dr. J. Tsuzuki, chief of the Tsuzuki Institute for the study of beriberi, has been supplying a preparation called "anti-beriberin" since 1911 in the form of a liquid for injection, powders and pills. He claims that this substance relieves the cardiac symptoms of beriberi in about seven days in adults and in about five days in infants. Dr. J. W. H. Chun of the Manchurian Plague Prevention Service dealt with the administrative control of beriberi. He recorded the fact that cases were seen in well-to-do persons in China. He dealt with the opposition that existed to the regulations proposed by the Far Eastern Association and showed that good reasons existed for such opposition, he suggested certain modifications to the resolutions which would make them acceptable to governments, merchants and rice consumers.

Dr. K. Omori and three co-workers gave reasons for regarding beriberi and experimental avitaminosis as being the same disease.

Dr. K. Shiga of the Korean Medical Service also accepts the orthodox view of beriberi and advocates the use of half-polished rice and wheat as a diet.

Professor Irisawa and Dr. Sakamoto pointed out that the European experiments on avitaminosis were carried out with diets which were defective not merely in vitamine B. but were also one-sided, and hence their description of experimental beriberi is inaccurate. They devised a diet which was deficient in vitamine B. but was satisfactory in all other respects and by the use of this on healthy youths they produced typical beriberi including the typical circulatory disturbances. They therefore conclude that beriberi is a pure avitaminosis.

Dr. Sugimoto of the Government Institute for Nutrition tested the utilization of different grades of rice on human beings over one year. He found that the utilization of proteins, carbohydrates, fats and minerals was far better when fully-polished rice was used than when half-polished or non-polished rice was used.

Half-polished rice in turn was better than non-polished rice, so that though chemical analysis is all in favour of unpolished rice, actual tests favour the polished rice.

There were several other papers on questions connected with beriberi, but the views of most of the leading workers have been stated and it appears that there is a far-from-unanimous opinion on the subject of the causation of the disease; just as in the Beriberi Committee of the Congress there was strong opposition to legislation based on the acceptance of the dogma of vitamine B. deficiency.

The emphasis which was laid on the importance of storage by the Dutch workers on the question of storage was particularly gratifying.

* * * * *

The following are brief abstracts of some of the papers read:—

A Historical Review of Research on Kakke in Japan.

By DR. AKIRA FUJINAMI.

Dr. T. Ogata of Tokeys expressed his doubts about the avitaminic theory of beriberi. He had already discussed the difference between beriberi and B. avitaminosis in a paper in the *Japan Medical World*, No. 2, Vol. 4, 1924. He now offers further evidence as to the differences between the diseases. He has discovered that the neuritic stage of polynuritis gallinarum appears toward the closing period of the disease, indicating the approaching death of the experimental fowl.

In B. avitaminosis, the effect of the disease on the nerve tissue is not confined mainly to the peripheral nerves as in the case of beriberi. The central nervous system is also liable to be seriously affected.

The quantity of vitamine B. contained in the organs of a beriberi corpse is not different from that in corpses from other diseases. It should be also noted that in beriberi it is impossible to prove the deficiency of vitamine B. in the body as in the case of an animal suffering from B. avitaminosis.

Chemical studies of Vitamine B. in Japan.

Professor U. Suzuki gave an account of his chemical studies on vitamine B. in Japan. He commenced his studies on rice in 1906 and isolated phytin and ferro-protein from rice-bran. His attention was directed to the extractive matters of the rice-bran; and at the end of 1910 he succeeded in isolating an active principle from the alcoholic extract of rice-bran by precipitation with phosphotungstic acid. He named it "oryzanin," as it was first isolated from rice, *Oryza sativa*; however the name vitamine B. is now commonly used for the same substance.

The isolation of oryzanin (vitamine B.) in a highly concentrated state enabled the author to carry out feeding experiments on cats, dogs, swine, etc., with artificial food mixtures. By these experiments, which were carried out in 1910-1912, it was clearly established for the first time that the animals could not sustain life when oryzanin was absent from their food, even though they were supplied with enough proteins, fats, carbohydrates and mineral matters. He proposed, therefore, the view that oryzanin is a new and hitherto overlooked food ingredient for animals, and also pointed out the great gap that then existed in the theory of nutrition. The author believes that these experiments, apart from their importance in the genesis of the beriberi, made the first firm foundation of the vitamine theory of to-day.

The Aetiology of Beriberi.

By PROFESSOR J. SHIMAZONO.

Various symptoms and pathological anatomical findings observed in birds and mammalian animals which

are fed with polished rice alone cannot be attributed solely to the deficiency of vitamine B, because feeding with polished rice results not only in the want of vitamine B, but also of the other sorts of vitamins, proteins, salts, etc. The author fed various mammalian animals and many healthy men with foods which were deficient in vitamine B. only, consisting of mixtures of pure food-stuffs or rice with vegetative and animal foods cooked according to the menu of the boarding-houses in some factories, and he observed the symptoms, and in the animals also the anatomical changes, and considered them in comparison with those observed in beriberi.

The results obtained in these investigations are as follows:—Although the B. avitaminosis of men and mammalian animals bears a close resemblance to beriberi, yet the two conditions are not to be entirely identified with respect to symptomatology and pathological histology. The principal difference is that in B. avitaminosis the appetite is very dull and the changes in the circulatory system are very slight. In addition to these facts, in B. avitaminosis hypertrophy of the cortical substance of the adrenal gland is quite evident; this is never seen in beriberi. It is necessary to investigate further the reason why avitaminosis B. cannot be entirely identified with beriberi, though their symptoms and histological changes bear such a close resemblance to each other, in other words, to solve the problem whether there may not be another important factor in the causation of beriberi.

Dysentery in Japan.

By DR. K. SHIGA.

There are still epidemics of bacillary dysentery in Japan, the number of patients amounting to from ten to twenty thousand every year in the summer and autumn months. The Shiga type bacillus was mostly responsible for the epidemics which attacked Tokyo and the adjoining districts from 1898 to 1900, i.e., in the early stage of the author's investigations into dysentery the Shiga type was isolated from the majority of five hundred patients subjected to his examination.

Since 1907 the Flexner types, i.e., all the acid types of dysentery bacillus, have been found in the majority of cases. Epidemics of the Shiga type also have occurred, but only very occasionally in recent years. Over ten years ago, the author produced a so-called polyvalent serum. Realising later that the Shiga antitoxic serum alone is effective for dysentery, he has devoted himself to provide only this antitoxic serum since last year.

Oral Vaccination against Bacillary Dysentery.

By DR. L. OTTEN and DR. L. KIRSCHNER,

Pasteur Institute, Bandoeng, Dutch East-India.

The summary of this paper is as follows:—It is possible to produce immunity in rabbits against *B. dysenteriae* (Shiga) by the oral administration of killed bacilli.

Oral vaccination results in an immunity against enteral as well as against parenteral infection, which is superior to that produced by subcutaneous inoculation, at least on administration of large quantities (50 to 100 times the subcutaneous dose).

There is no reason to suppose this immunity to be of local nature, the agglutination titre rising with successive ingestions and the serum having antitoxic properties.

As to the practical value of this method of vaccination, controlled experiments in prisons, lunatic asylums, etc., must be made before a decision is reached.

On healthy carriers of dysentery bacilli.

Drs. Kozo Saisawa and Bunshiro Tanabe examined the stools of large numbers of recruits at a time when there was no epidemic but some sporadic occurrence of bacillary dysentery. Among these men dysentery bacilli were detected in more than thirty cases. They were so-called healthy or contact carriers who were in

good health and gave no history of ever having had dysentery. As to the types of bacilli the "Y" (Hiss-Russel) and Flexner bacilli were found in the majority of the cases. The typical Shiga bacillus was isolated in only one case. Most of the carriers continued to discharge the organisms for long periods. In a certain case the bacillus was found in the stools for a period as long as fifteen weeks. The excretion of the pathogenic micro-organism was very irregular; in some cases it suddenly gave positive dysentery cultures after stool cultures had been negative for as long as two weeks. The germs were present in variable numbers. The carriers generally excreted the bacilli in small numbers. In some cases, however, enormous numbers of dysentery bacilli were found in the stool cultures. It has hitherto been believed that such healthy carriers discharge a pathogenic micro-organism only for a brief space of time; they may be temporary carriers. But the authors' investigations proved that this was not true in the majority of cases. The strains isolated were pathogenic to animals and showed pretty high virulence.

A review of the investigations of the authors brings out the fact that so-called healthy carriers are in the same condition as convalescent carriers. They are nothing less than chronic cases of bacillary dysentery with slight pathological manifestations such as minute ulcers and catarrhal inflammation of the mucosa of the large intestine. This means ambulant cases so mild that they are not clinically suspected. This is a very important finding from the point of view of preventive medicine.

Tropical Typhus.

By WILLIAM FLETCHER and J. E. LESSLAR.

This paper is of such interest to workers in India that the published abstract is given almost *in extenso*.

The application of the Weil-Felix reaction in some cases of obscure continued fever has shown that typhus occurs in a sporadic form from one end of the Federated Malay States to the other. It differs essentially from the ordinary type by reason of its lack of infectivity. It does not pass direct from one person to another and there is no evidence that it is carried by lice.

A mild form of typhus which is not contagious has been recognised in America for many years under the name of Brill's disease. It was first described in 1910 by Dr. Nathan E. Brill who based his account of it on the study of more than two hundred cases which he had seen in the Mount Sinai Hospital in New York during a period of fourteen years. This malady is characterised by intense headache, injection of the conjunctivæ, enlargement of the spleen and a maculopapular eruption. The fever lasts for a fortnight or less, and comes down by lysis or crisis.

Cross-immunity experiments made by inoculating animals with the blood of persons suffering from this disease and with blood from typical cases of typhus, have demonstrated the identity, or at least the very close relationship of Brill's disease to the classical form of epidemic typhus which occurs in Europe. There are however two outstanding points of difference. Brill's disease is rarely fatal and it is never contagious.

In 1911 McNaught described a similar disease in South Africa in which the prominent features were the same; sudden onset with intense headache, suffused eyes and a dark-red maculopapular eruption which left brown stains when it faded. The fever terminated at the end of fourteen days by rapid lysis or crisis. The patients often appeared extremely ill during the first week, yet none of them died.

McNaught noted the resemblance to typhus fever, but this he excluded on account of the mildness of the disease and because it was not contagious. He was convinced that the fever which he described was the same as Brill's disease in New York. It is interesting to note that the question of ticks being vectors of the disease in South Africa was raised at the time by Colonel Maher who had seen several cases at Potchefstroom.

Megaw (1917) has drawn attention to a sporadic and localised form of typhus in the Kumaon district of the Himalayas which he regarded, at first, as Brill's disease. He considers that it is probably carried by ticks. Yersin and Vassal saw non-infectious cases in Indo-China during 1908. Smithson investigated a similar outbreak in the sugar-cane fields of Queensland in 1910. In 1922 Maxy and Havers saw thirteen cases of the same kind of fever with a positive Weil-Felix reaction in Alabama. There was no evidence of louse infestation in these cases. In 1923 Hone reported the occurrence of a typhus-like disease in and around Adelaide. The Weil-Felix reaction was positive and the disease resembled typhus in every way except that it did not spread from man to man and there was no evidence that it was carried by lice. In February 1925, Megaw, Shettle and Roy described an outbreak of a typhus-like fever among a body of two thousand soldiers in Central India. The men who were engaged in manœuvres were living in two camps situated in country covered with jungle and uncultivated scrub. Though the condition of the camp was favourable to direct infection from person to person, there was no evidence that this occurred, and when a man fell sick he did not infect his fellows who shared the same tent. Lice were excluded as vectors and Megaw, who incriminates ticks, suggests that it should be called "tick-typhus." It attacks persons leading an open air life, camping or marching in jungle or scrub, and in this respect it resembles the spotted fever of the Rocky Mountains. The Weil-Felix reaction was negative in Megaw's cases, but possibly the *B. proteus* culture was at fault, as no mention of positive control tests is made in his report.

The typhus of the Malay States resembles these sporadic forms very closely and we call it "tropical typhus" because it appears to be more common in the tropics than the epidemic form; we do not mean to imply that it occurs nowhere else. It is necessary to distinguish it by some name; to call it simply "typhus" is to mislead and alarm the public who, though they may be quite ignorant of everything else about typhus, know that it is highly infectious and may spread like wildfire.

Kuala Lumpur, the capital of the Federated Malay States, is only four degrees north of the equator; the mean temperature is about 84° F. and there is no appreciable seasonal variation. Typhus had not been recognised in the country until recently.

Between August 1924 and January 1925 eighteen cases were diagnosed as typhus; thirteen in the State of Selangor, three in Negri Sembilan, one in Perak and one in Pahang. In most cases the disease was discovered by the examination of a blood specimen which had been sent to the laboratory because the patient had typhoid-like symptoms.

At about the time when the earlier cases were recognised several persons were admitted to hospital in Kuala Lumpur with high fever and died shortly afterwards. The cause of death was not discovered; typhus was not suspected but the blood of a patient with similar symptoms who was subsequently taken ill agglutinated X.19 in a dilution of 1 in 120 on the day of his death, which makes it probable, but by no means certain, that he died from typhus.

The general features of the disease are similar to those of typhus in other parts of the world.

Eight of the eighteen cases were mild, five were moderately severe, five were severe, none were fatal, but two were so ill that the prognosis appeared to be hopeless.

The incubation period was less than twelve days in one instance, in another it was as long as three weeks. The onset is sudden, with fever, rigors, headache, sneezing, catarrh and bronchitis; the symptoms in short resembling those of influenza. The illness develops rapidly and in a case of moderate severity the condition of the patient at the end of the first week is like that in the third week of typhoid fever. The fever is at its height from the eighth to the eleventh day. The

temperature is about 104° F., the pulse 120, and the respiration rate between 30 and 40. There is usually a sudden and dramatic change for the better at the end of the second week. Six cases ended by crisis, six by quick lysis, and six by lysis. The fever was prolonged by broncho-pneumonia or septic complications in three.

Thirteen of the patients suffered from bronchitis, eight were delirious. The knee-jerks were lost in six during the second week. There was deafness in eight. The spleen was enlarged in seven. There was glandular enlargement in ten.

There was a rash, or traces of one were found, in twelve of the eighteen patients, but it was profuse and conspicuous in only one instance. The eruption in Asiatic patients was usually limited to a few purpuric patches which would have escaped observation unless they had been carefully looked for. In one of the Europeans the rash resembled the rose-spots of typhoid so closely that a diagnosis of typhoid fever was made on the strength of the rash. The Weil-Felix reaction was positive in all. The end titre was between 1:400 to 1:1000 in four, over 1:1000 in fourteen. In some the reaction was positive as early as the seventh day; but in at least five cases it did not appear until the end of the second week or later. The titre increased up to the beginning of the fourth week and then declined. One patient, examined two months after the attack, gave a negative reaction; but, in another case, there was a definitely positive reaction six months after the beginning of her illness. The authors employed for the test an emulsion of living organisms given to them by Dr. A. Neave Kingsbury, which had been obtained from the Lister Institute in 1921. A dilution of 1 in 200 was taken as the limit above which the reaction was regarded as positive. Repeated tests were made in each case, and the evidence of a waxing and waning titre obtained in this way is cogent proof of active disease.

Control tests were made with the blood of 364 healthy persons and hospital patients. *B. proteus* X.19 was not agglutinated at a titre above 1 in 30 in 359 cases; it was agglutinated at 1 in 60 in four and at 1 in 120 in two. There was some evidence that the last two cases had suffered from typhus.

Ehrlich's diazo-reaction is usually present during the fever, but disappears soon after defervescence.

Marris's atropine test was negative in two cases where it was applied during the second week.

The results of the inoculation of patients' blood into guinea-pigs were nearly all negative; probably because the authors were unable to obtain samples before the tenth day of disease. A febrile reaction was obtained in the animals inoculated with blood from two cases and the virus was carried on by the inoculation of the brains of these guinea-pigs into others but it failed at the third passage, consequently the results of these inoculations must be regarded as inconclusive.

The typhus of Malaya does not spread directly from man to man. It does not spread in the household where a case occurs, and it does not spread in the hospitals where patients have been treated in the general wards. Six Europeans who contracted typhus in a military camp were all sleeping in separate, four-men tents, which were not near to each other.

Some of the towns in Malaya are very densely populated, but none of the patients came from these crowded areas; on the contrary nearly all of them lived or worked in uncultivated open country. The disease, like tsutsugamushi disease and the spotted fever of the Rocky Mountains, appears to be associated with limited areas of uncultivated land. The military camp to which we have referred was situated in open country which is used as a grazing ground for cattle. In addition to the soldiers who contracted typhus there, three Indian cow-keepers, who pastured their cattle on the site of the camp, were taken ill with the disease soon after the soldiers had left the district.

One of the most striking features of the Malayan fever is its race incidence. The population consists of Malaysians, Chinese, and Tamils; the numbers

of other nations are comparatively insignificant. Punjabis constituted less than one per cent. of the population at the last census and Europeans were less than 0.5 per cent.; yet seven of the typhus patients were Tamils, seven were Punjabis, only four were Europeans, and there were no Malaysians or Chinese. The number of Europeans is accounted for by the association of six of them with the same source of infection in a military camp. All the Punjabis were cattle-keepers. There were no cases of the disease among the Punjabi police and those engaged in other occupations. The same association of the disease with cattle was evident in the Tamils also; three of the four Tamil patients were cow-keepers.

No body-lice were found on any of the patients and the Europeans were entirely free from head-lice. The evidence of the epidemiology is sufficiently strong to exclude the possibility of lice being the vectors. No small ulcers, such as follow the bite of the infected mites in tsutsugamushi disease, could be found in any of the patients. Megaw has brought forward evidence which incriminates ticks as the carriers of the virus in Himalayan typhus and possibly the aetiology of the disease in the Malay States can be explained in the same way. The close association of nearly all the Asiatic patients with cattle and the fact that the majority of the Europeans had been camping in a place which is used as a grazing ground, are arguments in favour of ticks as vectors of the disease.

In places where there are cattle there are usually rats, whilst the site of the military camp is notorious for its rats. It is suggested that, as in the spotted fever of the Rocky Mountains, rats may act as reservoirs of the virus and as hosts of the larval ticks; while the adult ticks are conveyed from one place to another by cattle, which themselves are probably immune.

The Malayan disease resembles in many ways the typhus-like fever which occurs in Deli, Sumatra, and which is considered by Schüffner (1915), who first described it, to be a variety of tsutsugamushi disease. According to Schüffner its course can best be described by saying that it corresponds in all respects with that seen in enteric fever. This course, he says, sharply distinguishes it from typhus, with its brusque onset and its termination by crisis. There is usually a small ulcer in the groin or axilla, associated with enlargement of the neighbouring lymphatic glands and similar to the initial ulcer of tsutsugamushi disease. This ulcer marks the point of infection and is produced by the bite of a small mite which is a parasite of the field rat. The ulcer is discernible in all European cases, but it can be easily overlooked in native labourers among the multitude of lesions which are common on their dark skins. The habitat of the mite, *Trombicula deliensis*, which carries the disease, is uncultivated land. Walch saw over a hundred cases during 1923 among coolies who had been clearing undergrowth from some abandoned land on a rubber estate in Sumatra.

The propinquity of Sumatra to the Malay Peninsula makes it probable that a disease which is common in one country occurs in the other as well, and the question arises, Is the typhus of the Malay States the same as the form of tsutsugamushi disease which Schüffner described in Sumatra? The answer is in the negative; firstly, because the primary ulcer and localised glandular enlargement, which are characteristic of the disease described by Schüffner, do not occur in the Malayan cases, and secondly, because the Weil-Felix reaction is always positive in the latter. But, apart from tsutsugamushi disease, tropical typhus probably does occur in Sumatra and Dr. Vervoort, Director of the Pathological Laboratory at Deli, has recently sent the authors particulars of some cases of continued fever, without a primary ulcer, which gave a positive Weil-Felix reaction and resembled the Malayan fever very closely if they were not identical with it.

They believe that the disease has a wide distribution in both hemispheres. The most recent report of its occurrence is from the Rio Grande valley of Mexico.

Typhus in a severe form, known locally as *tarbadillo*, has been endemic in the Mexican plateau at an elevation of some two thousand feet, for hundreds of years but it was not recognised in the lowlands until last year, when Sinclair and Maxy (1925), investigated a small outbreak of mild typhus in an American cavalry camp on the frontier. Enquiries made among the medical practitioners of the neighbourhood showed that the disease had existed for years in the Rio Grande valley, and some of the doctors had seen hundreds of cases, about 2 per cent. of which were fatal.

The fever was characterised by an abrupt onset, with headache, rigors and vomiting. The temperature reached its highest point during the first week, it then became remittent in the second week, and returned to normal by about the fourteenth day, usually by lysis but sometimes by crisis. The shortest time in which the fever ran its course was seven days and the longest was twenty-five days. A typhus-like eruption appeared about the fifth day.

Sinclair and Maxy investigated twenty cases, only three of which were seriously ill and none died. Three of them were slightly delirious, the majority were dull and apathetic. A slight cough was present in all cases. Leucocyte counts were normal. The Weil-Felix reaction was positive. A few guinea-pigs were inoculated but they failed to show the characteristic febrile reaction and they were not immunised against the virus of epidemic typhus.

No two cases occurred in any one house and there was no evidence of direct infection from man to man. No body-lice were found and the authors are inclined to blame head-lice as the vectors, but the American soldiers who contracted the disease harboured none and inquiry showed that many cases had occurred among the better-class inhabitants of the valley who were free from vermin of every kind.

Sinclair and Maxy consider that the typhus of the Rio Grande is the same as the mild form described by Brill, which is endemic in New York under the name of Brill's disease and which has been proved to be true typhus by the test of immunity.

The descriptions of these outbreaks in different quarters of the globe are so much alike, and resemble so closely the disease which we call tropical typhus in Malaya, that we believe them to be records of the same disease. We fully expect that the application of the Weil-Felix reaction, with an active, standard strain of *B. proteus*, will show that this view is correct, and thus one more disease will be removed from the dwindling group known as the unclassified fevers.*

The Relations between the Erythrocytes and the Malarial Parasite.

Dr. C. D. de Langen of Weltevreden put forward the following views:—

1. The malarial parasite during its development is on the outside of the erythrocyte.
2. This has been definitely proved for the benign tertian parasite.
3. It has been proved also for the phase of the sub-tertian parasite which develops in the peripheral blood.

*It is interesting to note that the strain of *Proteus X.19* which was used differed not merely in certain sugar reactions but also in its agglutinating properties from the other strains of the organism which were tested. In some febrile cases belonging to the typhus group agglutination against the Kingsbury *Proteus X.19* was strongly positive while there was little or no agglutination against the other strains. Commonly there were some cases which gave a strong Weil-Felix reaction with the ordinary strains, but a negative reaction against the "Kingsbury" organism.

The name "tropical typhus" is open to criticism; if the disease should prove to be carried by a tick the name suggested "tick-typhus" will probably be adopted.
—J. W. D. M.

4. The malignant tertian parasite attaches itself more firmly to the corpuscle than does the benign tertian parasite.

5. Washing has no noticeable influence on the affinity for colouring of the parasites.

*The Serology of *Spirocheta carteri* in the Indian form of Relapsing Fever.*

The following is a synopsis of Lieutenant-Colonel Cunningham's paper.

An experimental study of the spirochaetes of the Indian type of relapsing fever has revealed the following facts:—

1. In experimental infection the spirochaete present during the first attack is serologically distinct from the spirochaete found in the relapse.

2. The difference between the two types of spirochaetes is quite definite; no trace of any group reaction, such as is found in other well known groups of organisms, can be detected.

3. There is no apparent difference in the morphology of the two types.

4. So far as the Indian type of the disease is concerned, that is a disease limited to one attack and one relapse only, only two serological types have so far been implicated. Infection with the one type is followed by a relapse of the other type.

If the sub-passages are made from each series of relapses in turn, the type of spirochaete found in the resulting relapses alternates between the two types.

5. These serological types appear to be permanent on sub-passage.

Yellow Fever as a Far Eastern Problem.

Prof. W. H. Hoffmann of Havana outlined the steps to be taken to prevent the introduction of yellow fever into the Far East.

Whilst it is true that the danger has been decreasing considerably, owing to the progress in the knowledge and the control of the disease, yellow fever being practically eradicated in America with the exception of two or three small and completely isolated and controlled endemic foci in the interior of the continent, yet Africa is known to be endemically infected. We know nothing reliable about the actual situation there, but the sea-ports seem to be free.

If under the present favourable situation, which depends in the first place on the excellent sanitary conditions in America, the danger for the Far East seems practically very small, it would be a great omission if the authorities were not completely prepared for immediate action against all emergencies connected with the problem, especially as they might present themselves under different political or social conditions.

To prepare their measures, the health authorities should have an official and permanent connection with the great American health organisations, especially the Pan-American Union, in order to be accurately informed at any moment about the distribution of yellow fever and especially about the infected countries and sea-ports.

If unfortunately an infected or suspicious case should be imported, or if a suspicious ship should enter a Far Eastern port, the health service has to take all measures possible to prevent the spreading of the infection on shore, which would mean a great danger for the whole Orient. Of course all other interested ports and countries should be warned immediately, if possible by a central organisation.

The patients and all other people on board should be isolated, being especially protected from the bite of *Stegomyia fasciata*, and observed during six days. The ship would have to be strictly separated at a good distance from the shore and from other ships, and thoroughly fumigated to kill all the mosquitoes, which present the greatest danger, because they may keep the infection for months.

All persons exposed to possible infection,—on board or on land—would have to be vaccinated with the anti-icteroides serum, which should be kept at hand, at least

in the most important places which are in regular communication with the American ports directly.

In a place where such an infected or suspicious ship has entered, especial attention by the health authorities should be paid immediately to any suspicious cases, which may occur on shore in relation with this event and which, if proved to be yellow fever, will not be easily overlooked or unrecognised, if the possibility is considered in time. They have to be submitted from the beginning, when they are most infective, to a most effective isolation, and absolutely protected against *Stegomyia fasciata*, to prevent possible propagation. The non-immunes of their environment will have to be treated in a similar way and to be protected without delay by prophylactic serum injection.

The corresponding anti-mosquito measures in the infected and the neighbouring houses are a most urgent and indispensable sanitary measure; especially fumigation to kill any infected mosquito.

With the necessary care and a normally working health service actually it should be easy, and it should be always possible, with relatively simple measures, to prevent the importation of yellow fever into the Far East.

On Nanukayami (Seven-day fever) in Japan.

By DR. RYOKICHI INADA.

There is in Japan a spirochaetosis which is called *nanukayami* (seven-day fever) or *akiyami* (autumn fever). This disease is in its symptoms very similar to spirochaetosis icterohæmorrhagica (Weil's disease); but this affection is distinct from the latter in certain epidemiological and immunological points. The causative agent is *Spirochæta hebdomadis*, which lately after further studies can be divided into two types, A and B. The former is more virulent than the latter. The B type corresponds to the former description of *Spirochæta hebdomadis*.

Formation of Urinary and Biliary Calculi in Animals fed on Experimental Rations.

By YOSHITOMO FUJIMAKI.

(From the Imperial Government Institute for Nutrition, Tokyo.)

The author investigated the formation of urinary and biliary calculi in albino rats and dogs kept on various diets.

Animals kept on vitamine B deficiency diet, vitamine C deficiency diet, vitamine B and C deficiency diet, protein deficiency diet and normal diet did not show any calculi, but those fed on vitamine A deficiency diet, vitamine A and C deficiency diet, vitamine A and protein deficiency diet, and vitamine A and inorganic P and Ca deficiency diet showed urinary and biliary calculi.

The stones have been studied chemically and also the treatment of the stones was studied.

The restoration of vitamins to the diets caused the disappearance of stones, probably because the urine, which was alkaline while the diet was deficient, became acid when the vitamins were abundant.

The Campaign against Leprosy in Chosen.

By DR. K. SHIGA,

Director of the Chosen Government General Hospitals, Keijo, Chosen.

Since the winter of 1921 the workers at Chosen have been using the ethyl ester of chaulmoogra oil prepared locally for the treatment of leprosy. According to the report of the Government Leprosy Hospital in Shorokuto island, twenty-four cases out of some three hundred lepers thus treated have been completely cured, and thirty other cases discharged in a convalescent condition.

These figures seem to be of great significance from the stand-point of the campaign against leprosy.

The lifelong isolation of lepers, which has been the only measure resorted to in Europe and America, is doubtless available for such countries where only a small number like tens or hundreds of patients exist, but in those countries where the number is many thousands or more this is not only impracticable, but also is opposed to the humanitarian sentiment, since lifelong isolation means nothing but a prison life. The most essential problem, at least from the standpoint of medicine, must be to impress the patients with the hope that "leprosy can be cured."

Hence the author advocates that in such a country as Japan, where numerous lepers exist, it is an urgent policy to adopt this remarkable remedy as a routine measure in combating this dreadful disease, so that the complete cure of as many lepers as possible or at least a cure to such an extent as removes the fear of further infection, may be attained.

Osteomalacia in China.

By J. PRESTON MAXWELL, M.D., B.S., L.R.C.P., F.R.C.S.,

and

L. M. MILES, B.S., M.D.,

Peking Union Medical College, Peking.

I. *Distribution*.—Osteomalacia has been found to be endemic in the provinces of Shansi, Shenshi, Kansu, Manchuria, and certain parts of Honan. The distribution of the disease is geographical, i.e., extremely prevalent in the high plateau regions.

II. *Prevalence*.—The disease occurs in about 2 per cent. of all women above the age of puberty.

III. *Clinical Manifestations*.—The disease is known among the Chinese by the name of "Yao, t'ui t'eng" or the disease of pains in the back and thighs. Deformities of the pelvis are most common, causing the characteristic triradiate pelvic inlet and very marked contraction of the bisischial diameter. The long bones are also frequently angulated, and the costo-chondral junction shows a depression with frequent nodular enlargement.

IV. *Diet and Metabolism*.—Diets of these patients were analysed and found to be deficient in calcium and vitamine content, though adequate in phosphorus.

In a metabolism experiment carried out over a period of seven days on normal diet, a negative calcium balance was demonstrated in three out of four women under study.

V. *Blood Chemistry*.—The calcium in the blood serum was studied in fourteen patients on a normal diet and was found to be greatly reduced in all. The phosphorus under similar conditions was also reduced in ten of the fourteen. The CO₂ combining power of the serum in ten patients did not reveal any acidosis.

VI. *Therapeutics*.—Therapy was instituted, consisting in increasing the calcium and phosphorus intake, and the administration of cod-liver oil, alone and combined with calcium and phosphorus. A study of the metabolism for seven days on four patients showed that the essential factor in therapy in cod-liver oil is some substance rich in vitamine "A." The blood calcium may be made to increase by giving calcium alone, but the calcium balance remains negative. Administration of cod-liver oil causes a previously negative calcium balance to become positive. Clinical improvement is marked following cod-liver oil treatment.

VII. *Effect of Maternal Osteomalacia on the Fetus*. Children born of mothers with active osteomalacia are defective in bone formation. Analysis of fetal blood serum sometimes shows a decrease in calcium, but it is usually normal.

Histological study of the bones shows imperfect ossification and increase in osteoid tissue. Chemical analysis of fetal bones in all cases shows a normal ratio between calcium and phosphorus, but in some cases shows a marked percentage decrease of mineral matter as compared with organic material.

A Statistical Observation on Scarlet Fever in Korea.

By Drs. T. WATABIKI and H. MIZUSHIMA,
Chosen Government General Hospital, Keijo, Korea.

In recent years the prevalence of scarlet fever in Korea and China appears to have increased and the severity of this disease at the present time is likewise remarkable. Also it is an interesting point that epidemics and cases of a very severe nature are common in foreigners, especially among Japanese who have recently arrived in Korea.

The epidemics among the Korean people appear not to be so great as among the foreigners in Korea. What cause can be assigned for such an interesting difference?

Amœbiasis among Koreans.

By PAUL D. CHOY.

(a) In one single routine examination of the stools of 20,000 hospital cases for intestinal parasites, amœbic infection was found positive in 1.5 per cent. of cases.

(b) In six routine examinations of the stools of 500 persons of all classes of people including students, nurses, farmers and factory workers of both sexes and from various provinces, amœbic infection was positive in 16 per cent.

Among students	..	..	29.8 per cent.
Among nurses	..	..	31.0 per cent.
Among farmers	..	..	31.0 per cent.
Among factory workers	..	..	39 per cent.

The Domestic Pig as a probable Reservoir Host of the Dysentery Amœba of Man.

By JOHN F. KESSEL, Ph.D.,
Peking Union Medical College.

In a recent article, Cameron (1924) has summarised the parasitic diseases common to the domestic pig and he there points out that the study of the pig as a factor in disseminating human disease has been greatly neglected. As one looks over the list of porcine parasites, one is greatly impressed with the dearth of protozoal parasites recorded.

It has long been known that among the intestinal protozoa *Balanitidium* is represented and *Iodamoeba* is also commonly found. *Endamoeba polecki* and *Endamoeba suis*, species of somewhat doubtful authenticity, have also been recorded.

Recently the author examined the faeces of one hundred pigs from local markets in Peking and found cysts of protozoa which in their gross morphology correspond with the cysts of *Endamoeba coli*, *Iodamoeba butschlii*, *Endolimax nana*, *Endamoeba dysenteriae* and *Chilomastix mesnili*. In addition two actively motile flagellates have been found, one a Trichomonas and one a small form resembling an Embadomonas.

Of particular interest to medical science is the fact that of the one hundred pigs examined (only one examination each), thirty per cent. showed the presence of cysts of amœbæ morphologically indistinguishable from *Endamoeba dysenteriae* of man.

The number of nuclei in the cysts ranged from one to four, the karyosome was massed and central and the nuclear membrane heavy, the glycogen mass was single or dispersed and the chromatoid body was characteristically bean-like in shape. Both in iodine-eosin stain and in permanent stains with hæmatoxylin, it was impossible to differentiate the cysts of this amœba from the cysts of *E. dysenteriae*.

However, as has been pointed out (Kessel 1924) morphology alone may not be a final proof of species; identity and transmission experiments together with cultural experiments are highly desirable. A series of such transmission experiments is now in progress.

From the morphological evidence alone it seems that the domestic pig may be a reservoir host of the dysentery amœba of man, just as it is thought to be of *Balanitidium coli* of man. If this eventually proves to be the case, a very important public health problem is here

presented, particularly in the farming districts of the Orient since the pig lives in close proximity to the family dwelling and since it will devour human excrement with facility. It seems possible therefore, that the pig may play an important rôle as a reservoir host in the life history of *E. dysenteriae*.

On the Resistance of the bloodlet dog against the transfusion of normal horse serum in large quantity.

By SHIGEO MATSUBA and IWAO HIROYE.

The authors found that dogs could tolerate surprisingly large quantities of normal horse serum after loss of blood.

It is a well known fact that horse serum is less harmful than other sera, when introduced into animals of different species, but no attempt has hitherto been made to transfuse an extremely large quantity of normal horse serum into other animals in order to determine to what extent the serum is tolerated by them.

Employing dogs as experimental animals, the authors have made some experiments in connection with this problem. As a first step, they performed a bloodletting from the common carotid of a normal dog in order to know how much blood can be withdrawn before the death of the animal, and noted that a loss of blood corresponding to about one-twentieth of the body weight is fatal. The experiments upon five dogs gave similar results, that is to say all dogs died within 30 minutes of withdrawing blood amounting to the quantity mentioned.

In order to examine whether the occurrence of death could be more or less delayed if any fluid be introduced into the blood circulation while the blood is being withdrawn, they introduced into two dogs a saline solution continuously by the intravenous route during the course of bloodletting. The dogs thus treated escaped death even when the fatal quantity of blood was taken, but they expired at the end of one hour, in spite of continuous introduction of the solution.

Having found by this experiment that a fatal quantity of blood can be withdrawn from a dog without killing it immediately if a physiological salt solution is introduced intravenously in a continuous stream, they proceeded to perform their principal experiment which was as follows:—

470 c.c. of arterial blood, corresponding to about one-thirtieth of the body weight, was withdrawn from a dog weighing 13.5 kilograms in 9 minutes, and in the meantime 500 c.c. of normal horse serum was transfused by the intravenous route. This dog survived, could walk on the following day and in the course of one week its general condition was quite normal.

A large quantity of arterial blood, corresponding to one-thirteenth to one-fifteenth of the body weight, was withdrawn from a series of normal dogs, and about the same amount of horse serum was transfused into them by the intravenous route. All the dogs thus treated not only escaped death, but manifested no serious symptoms of illness during the next 40 days, during which time the authors examined the blood every day, counting the number of red and white corpuscles and estimating the amount of hæmoglobin.

Current Topics.

Medicine and the Public.

THE case of the late Dr. F. W. Axham, who sought to be reinstated on the register of the General Medical Council, has aroused such controversy in the lay papers in India, as well as in England, that the very sound review of the whole situation given by Lord Dawson of Penn in his address at the House of Commons deserves to be studied by our readers. The following report of

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it is from the *British Medical Journal* of 6th March, 1926:—

About sixty Peers and members of the House of Commons attended a meeting at the House of Commons on February 25th to hear, at the invitation of the Parliamentary Medical Committee, an address by Lord Dawson of Penn on the relations of the medical profession, the General Medical Council, and the public. Dr. F. E. Fremantle, chairman of the Parliamentary Medical Committee, presided. Mr. Norman King, registrar of the General Medical Council, also attended.

In opening the meeting Dr. Fremantle recalled that last October members had been asked to attend a meeting at which osteopaths, chiropractors, and others were invited to state the case for special registration. The Medical Committee felt that as the osteopaths had first innings, members of the Houses of Commons and Peers would desire to hear the doctors' side of the case. The Medical Committee reserved the right to differ from Lord Dawson, whose pronouncement was not to be taken as representing the medical profession. On one thing medical members of both Houses agreed, and that was in the traditional desire of the profession to protect the public. The public had not recognized that the essential duty of the G.M.C. was not merely to do personal justice, but to protect the public on the lines laid down in the Act of 1858.

In his address Lord Dawson said that at present there was considerable criticism against the medical profession—he had never known this feeling so strong as now. The profession had no complaint against criticism, but in the course of the recent discussion there had been not a few suggestions that doctors were actuated by selfish class motives. That was not true. They had the ordinary mixed motives of mankind. If they were too good they would not be able to understand human nature, but a selfish policy would be the negation of the doctor's life. True, the medical man had his foibles. The profession did not like secrecy in regard to discoveries, and when a man combined secrecy with gain they claimed the right to cast him out. Moreover, they expected the successful man to undertake a certain amount of unremunerative work for public service. Doctors, he remarked, were quixotic enough to give the public advice on health which, if followed would deprive them of much of their livelihood. The profession accepted the principles that the good of the public should be the overriding principle, and that the profession should avail itself of knowledge from any quarter if of benefit to the people. They did not contemplate the legal prohibition of unqualified practice, but they were concerned with the question whether it should be recognized by the medical profession and the State.

Aims and Methods of Medical Education.

The crux of the situation was that diagnosis of disease must precede its treatment. The average period of medical studentship was five and a half years, and the primary object of the education was not to push in empirical facts but to teach the man to think. More than half the time was taken up with sciences which had no direct connexion with medicine. Every student had to dissect the human body. That preliminary training was not concerned with medical theories. It was pure knowledge. In the last two and a half or three years of the curriculum they taught the student disease in the wards and laboratories and by *post-mortem* study. Not till nearly the end of that course did they deal with treatment at all, though all the controversies raged round treatment. They could teach their men treatment quite quickly provided they knew disease. It would be criminal not to make a stand on the principle that there should not be any recognition of a man as an independent practitioner until he had been trained in diagnosis. After the finish of the training they put no limitations on medical men. They could become homeopaths, osteopaths, chiropractors, and he had presided at a meeting the other night which was addressed by an osteopath with a medical qualification, who had a fair hearing. Science was the same for all; there could not be two

anatomies, two physiologies. "Build," he said, "what theories you like provided you have learnt your job." That was demanded in other professions. If a man said, "I have a special gift. Without training I can build a bridge across that river," his hearers would tell him to qualify as an engineer. They insisted on special training for lawyers. They compelled every sea captain to study navigation before he navigated his ship. Why not insist on equal precautions on the sea of life? Let the osteopaths select their most brilliant students, put them through the medical curriculum, and then put them forth as osteopaths. The medical profession would never give way on the subject of adequate training.

Auxiliaries and Irregulars.

When a proper diagnosis had been made there was room for great latitude in the question of treatment, and he prophesied that treatment would often in the future be delegated to services ancillary to medicine. The medical profession had foreseen this, as shown by the fact that they had recently instituted a system of certificated midwives. He also mentioned the bacteriological assistants, the nurses, masseurs, and the operators of x-ray and light treatment, over all of which the doctor had a co-ordinating control. As far as osteopathy was concerned, if he personally found that an osteopath possessed, as he often did, manipulative skill, he welcomed his aid conscientiously given, provided it had been preceded by medical diagnosis.

It was part of the duty of the medical profession to protect the public from "stunts" and fancies, even if honest. These rose and fell in a never-ceasing stream, and were put forward with astounding light-heartedness. There was deep set in the human mind from the primitive ages a belief in the miraculous in medicine. Everyone was hunting for a short cut. Although he personally was in favour of listening to everything, they had to approach these new cults and fads with proper caution.

Osteopathy.

Osteopathy was only one of the new forms of practice, but it had been so much in the public mind that he dealt specially with it. Manipulative surgery followed bone-setting, in which Sir Herbert Barker had followed Hutton. Bonesetting, or manipulative surgery, meant gifted fingers, and it was clear that its leading exponents had these. This gift might be of use provided diagnosis preceded its exercise. Human beings were not built in water-tight compartments; many a bad joint was due to disease of the lungs or heart. The manipulative surgeon talked as the doctor was forbidden to do, about his successes, but he said nothing about his failures. Lord Dawson instanced the case of a youth with undiagnosed painful joints who was beautifully treated by a manipulative surgeon, but became worse because the affection of the joints resulted from gonorrhœa. Another case was that of a patient beautifully treated for paralysis of the legs—but he had a tumour. Diagnosis might thus be delayed, though the thing for which the medical profession was striving was earlier diagnosis.

The average osteopaths about the country did not excel in treatment, yet they were boomed in the press and by M.P.s who never mentioned Sir Robert Jones, who was the greatest manipulative surgeon in the world. Sir Robert had formed manipulative clinics all over the country. He had more in his little finger than the osteopaths had in their whole bodies.

Lord Dawson turned to the theory underlying osteopathy—that all illness resulted from displacements of the spine or from pressure on the nerves and blood vessels. That was sheer buffoonery. The x-rays could show whether there was displacement of the spine, and dissection could show whether there was pressure on nerves and blood vessels. Investigation by these means had shown that in no case was there the displacement or pressure which the osteopaths postulated. There were rival sects to the osteopaths, such as the chiropractors, from whom had sprung the napropaths, and if his hearers waited a few months they would get many more sects. He repeated that the crux was diagnosis. Given

that, medical men would accept aid from anyone who would give skilled treatment. Osteopaths had the choice of going through the medical course or of giving skilled treatment under medical control.

The General Medical Council.

Turning to the General Medical Council, Lord Dawson said it might vary in composition from time to time. Recent criticism of the personnel might be deserved, but that did not justify criticism of the Council as an institution. He himself disagreed with the G.M.C. in several particulars, but his duty while seeking to secure amendment was to obey. Recent offenders had wilfully broken the law. There were cases in life where a man's defiance of authority for conscience' sake might be justifiable; but he should be very careful to see that his defiance was not associated with material gain. In conclusion, he emphasized the point that good work in medicine was never theatrical, and that wonder-working and short cuts were always to be distrusted. Whether his hearers agreed with him or not, he asked them to believe that the medical profession was actuated by a desire to serve the public welfare.

Answering Sir E. Hume-Williams, Lord Dawson said they did not propose to make osteopathy without diagnosis illegal. Provided the doctor was satisfied that the osteopath was honest according to his lights and that his work was good, and that the patient wished to be treated, he would agree to such treatment. His opinion was that a doctor doing so would no more be covering than if he was employing an unqualified masseur. "Covering" was when the initiative was taken by an unqualified man who did not understand what he was treating. He would punish any doctor who did that.

Lord Knutsford reminded members of the House of Commons that they had forbidden unqualified practice by dentists. He would like to see that no man who was unqualified was allowed to practise medicine.

We welcome the clear statement of Lord Dawson on a subject which exercises the minds of the general public in India just as it does in England. The principle which should be followed in all countries is to insist on a sound education as a preliminary to any kind of recognised medical practice. Granted that a student has a good knowledge of biology, chemistry, anatomy and physiology, there need be little fear of his becoming a danger to the public. Such a student will almost certainly insist on acquiring a sound knowledge of medical science.

The Irish Free State and the Medical Council.

(*Jour. American Med. Assn.*, February 20, 1926, p. 564.)

In the London letter of the *Journal of the American Medical Association*, dated January 22nd, 1926, the subject of the Irish Free State and the Medical Register is discussed as follows:—

The disastrous effects to the Irish medical schools likely to be produced by the proposed separate medical register have been pointed out in previous letters. Evidently the difficulties are being felt by the Free State government, for legislation is about to be introduced into the Dail to extend the existing arrangement for a further period of six months. This news has been received with much satisfaction by all classes in Ireland. The decision of the government to set up a separate register, inspired by nationalist sentiment, was one of its greatest blunders. Even among its staunchest supporters hardly anybody can be found to support its action, and it is generally hoped that, now that further breathing space has been secured, the last has been heard of the proposal to isolate Irish physicians from the rest of the empire.

The Cremation Society of England.

METHODS of disposal of the dead in India are, of course, a question of religious usage, but there must be many Europeans in India—medical men and others—who will be interested in a report which we have recently received, the *Transactions of the Cremation Society*

of England for 1925.* This report constitutes the 51st annual report of the Society, and there can be no question that the movement in favour of cremation in Great Britain is gaining in popularity. There are now 16 British crematoria under the Society, and 2,701 cremations were carried out at these during the year. The four chief ones near London are at Golders Green, Ilford, Norwood and Hendon Park. Some estimate of the wide appeal of the Society is to be gathered from the names of some of its most eminent members who died during the year, and whose bodies were cremated; these included Sir William Garstin, the great irrigation engineer of Egypt; Professor McTaggart of Trinity, Cambridge; Field-Marshal Lord Ypres; Major-General Sir Richard Westmacott; Sir Rider Haggard; Bishop Ryle; Sir James Mackenzie, the great cardiologist; and Sir George Gibb, the pioneer of the underground railways of London. The late Sir Charles Cameron, the celebrated head of the Public Health Service of Great Britain, was President of the Society from 1904 to 1921; whilst the names of many distinguished medical men are on its roll of membership.

The *Transactions* record a year of steady progress. No attempt is made to earn a financial profit by the Society, but in spite of this, the financial position of the Society is a strong one, and all surpluses are devoted to improving the crematoria under the Society. The third annual conference of cremation authorities was held in August at the British Empire Exhibition at Wembley, and a big public meeting followed, at which Sir Thomas Horder presided. Many lectures on the subject were delivered at various centres during the year.

The *Transactions* include the annual report of the Council, an account of the annual meeting of members, presided over by Dr. P. Chalmers Mitchell, C.B.E., F.R.S.; a list of members; reports of the different crematoria; reports from abroad—from which we gather that there is a Cremation Society of Bengal of whose existence we were previously unaware; and a detailed report of the third annual conference of cremation authorities at Wembley, which the reader will find to be full of interesting matter. It contains many interesting addresses and discussions on the subject of cremation *versus* burial. The authorities of Greater London are apparently hard put to it to find room for new graveyards, and crematoria offer a sanitary and dignified substitute. (Even in India, in the presidency cities with a large European population, the subject of providing space for graveyards is an important one, and the question of further accommodation for Christian graveyards in Calcutta has recently been exercising the minds of municipal councillors.)

With the *Transactions* is a small pamphlet on cremation, illustrated with photographs from the Golders Green Crematorium. The general plan of the crematorium is a chapel in which the religious ceremonies are held; and from which the coffin passes through an intermediate room into the columbarium, where the incineration takes place. The ashes may be either collected in an urn, or dispersed in the adjacent "Garden of Rest,"—an account of which by Councillor Edward Bramley in the *Sheffield Daily Telegraph* shows that it is as beautiful and sacred as any graveyard. Further, the cost of cremation is actually less than that of ordinary burial; whilst, from the public health point of view its advantages are obvious.

Important Features in the Correct Diagnosis of Dysentery in India.

(A preliminary note on ten months' experience of dysentery in Poona).

By Major J. A. MANIFOLD, D.S.O., R.A.M.C.,
(*Jour. Royal Army Medical Corps*, February 1926, p. 81.)

THIS paper is of such interest and importance that we have taken liberal extracts from it.

**Transactions of the Cremation Society of England* for 1925. London: 52, New Cavendish Square, W.1. Price 1s. 6d.

Major Manifold opens his paper by the following extracts from the literature:—

(1) "Of the 573 cases of dysentery, 479 were protozoal in origin, 16 bacillary, and the remainder were unclassified." (*Report on the Health of the Army in India, 1922*).

(2) "Of 318 cases of dysentery among British troops, 303 were protozoal in origin, 6 bacillary, 9 unclassified."

"Of 172 cases of dysentery among Indian troops, 151 were protozoal in origin, 5 bacillary, unclassified 16." (*Southern Command Statistics for 1923*).

(3) "Cunningham (1923) found 86 per cent. of cases of dysentery in the jails of Eastern Bengal to be of bacillary origin, and that much the same proportion held for Moplah prisoners in the Madras Presidency."

"Our experience in Calcutta during the years 1920-23 is that bacillary dysentery is at least five or six times as common as is amoebic dysentery." (Acton and Knowles, *Indian Medical Gazette*, 1924, Vol. LIX, Nos. 7 and 9.)

On taking over the laboratory in Poona, Major Manifold accepted the current belief that, as statistics had shown for many years, amoebic dysentery is the commonest type in India. Conversations with medical officers who had been many years in the country served to strengthen this opinion, and the summarized reports of the laboratory for the year 1924 appeared to clinch the matter.

Ten months' experience has entirely altered this impression. There is no question now that in Poona and its surroundings so far as the military population is concerned:—

(1) Bacillary dysentery is an extremely common and widespread disease, far more so than amoebic dysentery.

(2) Much of it is undiagnosed owing to a lack of laboratory investigation and to the usually mild nature of the intestinal disorders which are encountered.

The lack of specific diagnosis in the past has been due to want of appreciation, both on the part of the laboratory staffs and the medical officers in charge of these cases, of the value of the microscopic examination of the stool in cases of bacillary dysentery and to lack of knowledge regarding proper methods of collection and despatch of specimens to the laboratory.

The investigations of many workers on these diseases in various parts of the East, including India, such as Wenyon, Acton, Knowles, Anderson, Cunningham, Manson-Bahr and many others, represent the true state of affairs.

Certain Widespread Misapprehensions exist at Present.

Dysentery is an ugly word and looks bad on paper. Diarrhoea, colitis, etc., are more or less respectable and do not indicate insanitary conditions to such an extent as the former.

Ninety-nine per cent. of dysenteries sufficiently severe to be diagnosed as such are considered amoebic in origin. Most diarrhoeas are also amoebic in origin. The laboratory diagnosis is hardly worth waiting for before commencing emetine treatment. Emetine is the specific for intestinal troubles. Its toxic action is negligible or only of academic interest. Often it is administered much in the spirit of "when in doubt lead trumps." "The writer has been assured that in cases of true bacillary dysentery emetine in small doses gives excellent results." "It soothes the bowel." Possibly this is so, but both bowel and patient with an undiagnosed Shiga infection might be soothed for ever.

The figures from January 1 to August 1925, are taken from Major Manifold's own laboratory reports. The laboratory reports for the first ten months only of 1924 are given by way of contrast, as he took over the laboratory in early November of that year.

Results Tabulated.

1924 (10 months).		1925 (8 months).	
Amoebic dysentery ..	84	Bacillary dysentery ..	117
Bacillary dysentery ..	8	(<i>Bacillus</i> of Flexner ..)	43)
(<i>Bacillus</i> of Flexner Nil)		(<i>Bacillus</i> of Shiga ..)	15)
(<i>Bacillus</i> of Shiga ..)	8	(? Flexner group ..)	8)
Amoebic dysentery ..	12	(inagglutinable)	

That the diagnosis of the 117 cases reported on as bacillary dysentery was correct, is proved by the fact that they were treated as such, i.e., antidyenteric serum plus salines for the severe cases, and salines only for the mild cases. Emetine was not administered, and the cases reacted to treatment and quickly recovered. Also there was no question of an epidemic. The cases occurred sporadically in all parts of the cantonment and followed closely the seasonal incidence found to exist in former years for the so-called amoebic dysentery.

The reports of the cases labelled as amoebic are as follows:—

(1) *E. histolytica* and cysts present.

(2) Precystic forms of *E. histolytica* present.

(3) Dead *Entamoeba histolytica* present.

(4) Cysts of *E. histolytica* present.

Probably many of the so-called *E. histolytica* referred to in these reports are the macrophage endothelial cells seen constantly in cases of bacillary dysentery.

(1) *Entamoeba histolytica* and cysts present. The presence of vegetative forms of *E. histolytica* and its cystic forms together in the blood and mucus of a case suffering for the first time from acute amoebic dysentery is presumably impossible, except in very rare cases. In chronic cases of dysentery of course all forms of *E. histolytica* may be found together, and in the semi-solid stool of the recovering case and the non-acute stage of an *E. histolytica* carrier precystic amoebae and cysts may be found together.

The reports referred to above must be mainly on acute cases containing blood and mucus—and not on carriers or chronic cases.

It is likely that many of the so-called *E. histolytica* were really endothelial cells with included red cells, and the cysts were probably degenerated polymorphonuclear cells, etc.

(2) *Precystic forms of E. histolytica present.*—These are most unlikely to be met with in the stool of acute dysentery at the time the specimen is seen in the laboratory, and if they are seen by chance they cannot be distinguished from the similar stage of *Entamoeba coli*. This is agreed to by all protozoologists. It is probable, therefore, that such cells were endothelial cells without included red blood corpuscles.

(3) *Dead E. histolytica present.*—A specific identification of a dead amoeba is difficult even for the most expert protozoologist, and if it is degenerated, as would almost certainly be the case, is an impossibility.

(4) *Cysts of E. histolytica present.*—Here again these cysts were seen in apparently acute cases. Their extreme rarity in such cases has been pointed out above, and some of them must have been degenerated polymorphonuclear cells, etc. Lastly, there was no evidence of any reports on the cytological examination of specimens of mucus from cases of dysentery, and medical officers, not being accustomed to these reports, at first did not realize their importance from a diagnostic or treatment point of view.

Many writers have laid down that the presence of red blood corpuscles in an amoeba should be taken as a standard for a specific diagnosis of *E. histolytica*. This is insufficient unless one has been trained for a long period to recognize what really is an amoeba. If in acute cases of dysentery an actively motile cell containing red blood corpuscles was accepted as an *E. histolytica*, and no non-motile object regarded as such, the cases of amoebic dysentery would probably rapidly diminish in number, as has been the case in Poona.

"These erroneous findings plus the important fact that the majority of the bacillary dysentery cases are mild in nature, being due to the bacillus of Flexner, and clear up in five or six days with treatment by salines, or oleum ricini, have given rise to the misapprehension among the majority of the medical profession (not only military officers) in this country that amoebic dysentery is almost universal. The writings of Knowles, Acton, Cunningham, etc., have not been appreciated to any general extent by general practitioners. Civil medical practitioners tell me that they see many cases of dysentery, and practically all are amoebic in origin.

On inquiring why they think so, the inevitable answer is given that the cases usually clear up in three or four days with emetine treatment. Invariably salines or oleum ricini are given as well."

The following incidents illustrate the haphazard method in which emetine is often given and the dislike of the term dysentery that exists when the condition is mild.

(1) Case with history of previous attack of pericarditis, with enlarged heart, enlarged liver, crepitations at bases of both lungs, œdema of legs, great dyspnoea. On account of the enlarged liver, diagnosis was evidently "probable amœbic hepatitis," so emetine injections, one grain daily, were administered. Final result, death. One cannot say that death was due to the emetine injections, but the effect on the myocardium, already in a condition of probable chronic interstitial myocarditis, cannot have been beneficial.

(2) Case of a civilian with a history of continuous fever for some months and intermittent diarrhoea. Treatment:—innumerable courses of emetine, plus at intervals quinine by intramuscular injections. The liver in this case progressively enlarged until it became of enormous size and the patient steadily wasted away. Finally a stool was sent to the laboratory, and *Bacillus typhosus* was isolated. All emetine treatment was forbidden and treatment on general lines only carried out. The liver gradually returned to its normal size. The patient rapidly put on flesh, and apart from being a chronic typhoid carrier, apparently is now well again. The physician who looked after this patient, and put a stop to the emetine treatment has no doubt that the case was one of emetine poisoning. He informed me that when he first saw him, the patient had been injected with one grain of emetine daily for four months.

(3) Several cases are encountered suffering from so-called colitis, some with histories of dysentery in the past, and all with a previous history of diarrhoea. When seen they state that they pass a little mucus in the stool at intervals, and suffer from slight abdominal discomfort. Sometimes, also, they have a slight rise of temperature. All have had courses of emetine, and from quite a number, when the mucus alone was examined, the bacillus of Flexner has been isolated in almost pure culture, in one case the bacillus of Shiga.

The percentage of actual isolation and serological identification of the infective bacilli is far too small; probably when all are investigated about sixty per cent. The reasons for this are numerous, but the most important undoubtedly are:—

(1) The majority of the cases were mild in nature. As a result the patients did not report sick and were often not admitted to hospital until the third or fourth day of the disease.

(2) Earlier in the year medical officers did not appreciate the necessity of speed in despatching samples to the laboratory after passage of the stool, nor of sending samples collected early in the case.

(3) Faeces were often intimately mixed with the mucus in a test-tube before despatching the specimen to the laboratory, and as several hours and sometimes days elapsed before its arrival the recovery of the infecting organism was hopeless. Some specimens even proved to be sterile and it was found they had been collected in receptacles containing cresol.

(4) Owing to the shortage of Petri dishes, plates of media had often to be used when still wet with water of condensation, rather than allow the specimen to remain longer unplated. As a result discrete colonies were sometimes absent.

(5) Owing to the lack of training of the laboratory staff and defective media, sugar reactions were often doubtful and cultures were contaminated and lost.

(6) The inagglutinability of recently isolated cultures of the bacillus of Flexner was at first not appreciated. Cultures were thrown out after two subcultures. Later experience has proved the necessity of much more frequent subculturing before deciding that serologically they do not belong to the Flexner group. Also for

some time efficient polyvalent Flexner agglutinating serum was not available.

The majority of these difficulties have now been overcome and in the month of August, as stated above, twenty-three typical bacillary dysentery exudates were sent to the laboratory and from twenty of these either the bacillus of Shiga or the bacillus of Flexner was isolated.

Medical officers should always write on the report the hour at which the stool was passed.

When possible the entire bed-pan is brought to the laboratory and the specimen dealt with at once. Where this is impossible, as with specimens from hospitals a few miles from the laboratory, a specimen of fresh mucus only is forwarded in one test-tube, and another portion of mucus in the glycerine and saline solution mentioned in the instructions. Both specimens are plated out. From long distances films of mucus are also sent on slides for staining.

On receipt of the sample, a specimen of the mucus is at once plated out and then examined microscopically. The bearer of the specimen is then handed a report stating:—(a) that the cellular exudate of the case is that of typical bacillary dysentery; or (b) that the patient is suffering from dysentery, but that the microscopic picture of the exudate cannot definitely be said to be that of typical bacillary or of typical amœbic dysentery: a request is added that another specimen may be sent as soon as possible; or (c) that *Entamoeba histolytica* is present. This advance report has proved of great value in enabling medical officers to commence at an early date injections of anti-dysentery serum in severe cases.

A fact not sufficiently appreciated by the writer at first was the inagglutinability of freshly isolated strains of the bacillus of Flexner. Repeated subcultures have to be made before some organisms will agglutinate.

Plates from dysentery cases are now always returned to the incubator for a further twenty-four hours in view of a possible negative result on the first day, and this also has led to an increase in the positive results.

By far the larger number of bacillary dysenteries in Poona are probably due to organisms of the Flexner group. The actual strains responsible have not been worked out yet.

The dysentery cases are restricted to no particular unit or area and can be traced to no known cause. From an average number of 8 typical bacillary exudates per month from new cases for the first five months of the year, there was a sudden jump in June to 24 cases, in July to 35 cases, and in August to 23 cases. It was noticed that flies began to become a nuisance at approximately the same period.

The routine examination for carriers of organisms of the dysentery group among menials handling food has been a complete failure. Carriers must exist among the Indians population in large numbers, and probably with the assistance of flies are almost certainly the cause of the endemic nature and widespread distribution of the disease in the cantonment. It must, therefore be the technique of the examination that is at fault. When mucus is present in the stools dysentery organisms are easily isolated, if the mucus is dealt with quickly. Where only faeces are present then isolation is almost impossible.

Notes on Bacteriological Diagnosis, and Directions for the Collection and Despatch of the Material for Examination.

From analysis of the figures of the past year it has become apparent:—

(1) That many cases of mild but true dysentery have been included under diagnostic headings such as "colitis," "enteritis" and "diarrhoea."

(2) That confusion exists between the differential diagnosis of bacillary and amœbic dysentery. As a result an undue number of cases have been diagnosed amœbic dysentery. Some of these have later been found to become cases of chronic dysentery and from these the bacillus of Flexner or the bacillus of Shiga has been isolated.

(3) That there are a number of fevers of short duration the correct diagnosis of which might have been obtained if blood cultures had been taken sufficiently early, and with the proper precautions to avoid contaminations.

(4) That specimens have been sent to district laboratories for examination without special precautions being taken to counteract the effects of temperature and delay in transit.

(5) Samples of stools from dysentery cases are forwarded to the laboratory without regard to the selection of the particular portions which are of service as regards laboratory diagnosis.

(6) If many tropical diseases is often an... the closest co-operation exists between the medical officer in charge of the case and the medical officer in the laboratory. Medical officers should therefore pay particular attention to the method of collection and forwarding of samples to the laboratory as detailed below. Without this personal attention to detail on the part of the medical officer in charge of the case a correct diagnosis from the laboratory becomes impossible.

(7) *Post-mortem* reports are not sufficiently full, and sufficient use has not been made of the laboratory, as regards the microscopic examination of diseased tissues. Portions of diseased tissues should be sent in all cases to the laboratory for microscopic examination and report.

(8) Similarly, new growths or diseased tissues, removed at operations, should likewise be forwarded to the laboratory for a report on the pathological appearances.

With reference to the diagnosis of the dysentery group of diseases, certain points may be noted which are of assistance to the medical officer when sending samples to the laboratory.

Bacillary Dysentery:—(1) Typical Case.

After a preliminary diarrhoea for a short period, frequent and characteristic stools are passed. Pain and tenesmus during the passage of the stool are marked features; often also the temperature is raised.

Character of the stool.—When the disease is established the stool consists almost entirely of mucus, often streaked with bright red blood, viscous, adherent to the bed-pan, and without odour. If tested with litmus paper as soon as it is passed it is alkaline in reaction.

Fæces are as a rule absent or only present in a small amount.

In such a case microscopic examination of the mucus by a pathologist is of the greatest diagnostic significance and a preliminary report of the result of this examination should be forwarded at once by the district Deputy Assistant Director of Pathology or officer in charge brigade laboratory to the medical officer in charge of the case.

Cases vary between a mild type in which fæces may be found along with the mucus, usually due to an infection by the bacillus of Flexner and a very acute toxic type, usually due to an infection by the bacillus of Shiga.

Points regarding Bacteriological Diagnosis.—(a) Organisms of the dysentery group are recovered with difficulty from the stools except in the early stages of the disease; therefore samples of the stool should be sent to the laboratory as soon as possible after the patient has come under observation.

(b) Organisms of the dysentery group are usually found in the mucus and are easily overgrown and destroyed by other organisms, therefore samples sent to the laboratory should be as free from faecal matter as possible and consist only of portions of mucus.

(c) Organisms of the dysentery group rapidly die after the passage of the stool. In this country their death is even more rapid owing to the high temperature of the external air; therefore in cases in which more than two hours must elapse between the passage of the stool and its arrival in the laboratory, solutions must be made use of which prevent the growth of bacilli other

than those of the dysentery group (see methods detailed below). The mucus, therefore, in such cases should be placed in the solution as soon as possible after it is passed.

(d) Medical officers should invariably themselves examine the entire stool in the bed-pan and themselves select the portion which is to be sent for bacteriological examination.

(e) Instructions should be given to subordinates that all cases suspected of suffering from dysentery should be given a clean dry bed-pan free from antiseptics and that patients should be instructed to pass their urine first into another receptacle in order that no urine can be mixed with the stool.

(f) As long as mucus is present in the stool a sample should be sent daily to the laboratory until the laboratory report has been received indicating the nature of the infective organism.

Amœbic Dysentery.

In this condition there is, as a rule, less pain and tenesmus than in the bacillary type of dysentery. The stools are usually also fewer in number and the patient not so acutely ill. Blood, dark in colour, and mucus are often intimately mingled with fæces. The stool is often offensive and may resemble that of a case of diarrhoea. When freshly passed it is usually acid in reaction. If a portion of the mucus be examined under a microscope directly the stool has been passed, motile *E. histolytica* containing red cells may be found. Cysts of *E. histolytica* are not present in the stools during an attack of dysentery. Medical officers are cautioned against diagnosing specific amœbæ and cysts unless they have had special training and considerable experience.

Points regarding Laboratory Diagnosis of E. histolytica.—(1) The amœbæ in the stool commence to die as soon as the stool has been passed. Within one hour they are often unrecognizable without special staining methods and then with difficulty. Therefore in stations distant from the laboratory, the laboratory diagnosis can only be carried out:—

(a) On the nature of the cellular exudate present in the mucus; (b) on the presence or absence of *E. histolytica* in stained films of the mucus.

Attention is therefore drawn to the methods of fixing and forwarding such films of mucus to the laboratory.

(2) Vegetative *E. histolytica* are present in the mucus in cases of acute, subacute and chronic dysentery, but in the latter are not as evenly distributed throughout the mucus as in the acute form. Particular care should therefore be taken in these cases to select blood-stained portions of mucus or small sloughs of mucous membrane which are often present, for examination; as in these amœbæ are more likely to be present.

(3) In amœbic diarrhoea (i.e., diarrhoea due to infection by *E. histolytica*, but without blood and mucus being present in stools) precystic forms of *E. histolytica* largely predominate. These can only be differentiated with the greatest difficulty, if at all, from precystic forms of *Entamoeba coli*. After a preliminary report from the laboratory that such precystic amœbæ are present, purgatives should be strictly avoided and a solid portion of the stool sent for laboratory examination in the manner described later as for examination for cysts, when the diagnosis will be established by the discovery of the specific cysts.

(4) Films of mucus on cover-slips or slides should be made in the manner detailed below as soon as possible after the passage of the stool and in all cases by, or under the supervision of, the medical officer in charge of the case.

(5) *E. histolytica* cysts are only found as a rule in solid fæces, often in small particles of mucus on the outer surface. These portions should therefore be selected for transmission to the laboratory and thoroughly emulsified in the iodine solution detailed below.

(6) Instructions to subordinates as regards the use of a clean dry bed-pan by patients and the absence of urine from the fæces are even more important than in

the case of bacillary dysentery. Urine destroys *E. histolytica* and renders it unrecognizable almost at once.

Diarrhæic Conditions.

As it is possible that many of these conditions are due to a mild infection by the bacillus of Flexner or organisms of the food poisoning group it is desirable that stools after passage should be emulsified without delay in glycerine saline solution and forwarded to the laboratory.

Should amœbic diarrhœa be suspected, three films of fæces should be fixed and despatched to the laboratory as in cases of suspected amœbic dysentery. At the same time a sample of fæces should be emulsified in iodine solution as for examination for cysts and forwarded to the laboratory.

The methods to be employed in the collection and forwarding of samples of stools from cases of dysentery to the laboratory:—

Three essentials have to be carried out:—

(1) A specimen should be collected as early in the course of the disease as possible, i.e. at the earliest opportunity after ascertaining that blood or mucus is present in the stools.

(2) The specimen must be dealt with as described below directly after passage of the stool. The longer the delay, the less chance there is of a diagnosis being established.

(3) The specimen must be collected in a clean dry bed-pan without antiseptic or admixture with urine.

Procedure to be adopted with all Dysentery Stools.

(1) Test reaction of mucus with litmus paper and report the result to the laboratory when sending sample.

(2) Spread some mucus on a clean slide, allow it to dry and forward it to the laboratory. (If a little mucus is picked up with the litmus paper and gently drawn over the slide a good film can be obtained. If pressure is used in making the film the cells are broken down and unrecognizable when stained.)

(3) Transfer as soon as possible portions of mucus as free from fæces as possible into a solution in a sterile test-tube of thirty per cent. neutral glycerine in 0.6 per cent. saline. (Glycerine must not be acid in reaction).

Applicable to Cases of Suspected Amœbic Dysentery.

(4) A portion of mucus as free from fæces as possible should be picked up and spread on three cover-slips or slides. Before the film dries the cover-slips or slides should be dropped into Schaudinn's solution and left in the solution for fifteen minutes. They should then be transferred to a bottle containing seventy per cent. alcohol with a little cotton-wool in the bottom of the bottle to avoid breakage and forwarded to the laboratory.

Schaudinn's fixative is as follows:—

Saturated solution of mercuric chloride in normal saline	..	2 parts.
Absolute alcohol	..	1 part.
Glacial acetic acid	..	3 to 5 per cent.

On the report from the medical officer should be written a short clinical history, including a description of the entire stool and the time clapsing between passage of the stool and the immersion of its mucus in the glycerine solution or fixation of the films in Schaudinn's solution.

Transmission of fæces for examination for cysts of E. histolytica.—A solid portion of the stool should be chosen, particularly outer portions with adherent mucus. These should be thoroughly emulsified in a solution of iodine 1 part, potassium iodide 2 parts, and water 100 cubic centimeters.

Transmission of fæces from cases of suspected amœbic diarrhœa.—Portions of fæces (and vomited material if available) should be emulsified in the glycerine and saline solution and forwarded to the laboratory as for the enteric bacilli.

Should amœbic diarrhœa be suspected, three films of fæces should be fixed and forwarded to the laboratory, as described above for the mucus in cases of amœbic dysentery. At the same time a sample of the fæces should be treated in the manner described for cysts of amœbæ, and forwarded along with the films.

The Treatment of Amœbic Abscess of the Liver by Emetine Alone.

WE take the following abstract of correspondence, which will be of considerable interest to our readers, from the *Lancet* of the 27th March 1926, p. 681:—

To the Editor of THE LANCET.

SIR,—Further to my letter on this subject which appeared in your issue of January 16th, I would like to add some of the arguments on which I base my conviction that emetine alone is sufficient to cure cases of hepatic abscess.

1. *Pathology.*—In the first place had the condition been called anything but an abscess and had ipecacuanha been properly appreciated as a therapeutic agent, it is very doubtful if surgical intervention would ever have reached its recent, but I trust fading, importance in these cases. In its origin the "abscess" is secondary to bowel infection; it is not circumscribed; its inner surface is extremely irregular; its contents are sterile; the causative organism is in the tissues and, in fact, from every point of view it is exactly analogous to a gumma. People obsessed with the pyogenic abscess idea find it difficult to believe that the absorption of the contents of "hepatic abscesses," large and small, is possible. A little reflection should lighten this difficulty. For instance, it would be interesting to compare the cross-section of the myriad lymphatics of the liver with that of the aspirating needle.

2. *Diagnosis.*—It will be a sad day indeed for tropical practitioners if the dictum is accepted that aspiration is essential before the diagnosis of hepatic abscess can be made. I know that such a measure need not be necessary, as I have published the record of a case in which, though unproved by aspiration, the abscess ruptured two hours after treatment was begun. Would Dr. Manson-Bahr also require that a psoas abscess, another analogous condition, should be aspirated before the diagnosis could be made, and if not aspirated would he classify the case as unconvincing if and when the contents were absorbed in the course of treatment at, e.g., the Alton Cripples' Hospital?

3. *Treatment.*—I maintain that aspiration with evacuation of a hepatic abscess introduces a definitely deleterious factor and upsets all the natural processes of elimination. The direction of flow of the defence forces, so long as the amœbæ are alive, is centripetal, but once the amœbæ are killed the direction becomes centrifugal unless the contents are forcibly evacuated. In this case the flow remains centripetal because nature abhors a vacuum.

I have demonstrated, and many cases from the literature confirm my statement, that emetine alone is sufficient to cure cases of liver abscess. Aspiration, though a handicap, does not ultimately prevent cure, but once this operation is performed the result, even though it is happy in a large number of cases, is not obtained in the quickest, the most certain, and the most humane way possible. Finally, it is well known that abscesses, especially in the earlier stages, are often multiple, up to 25 per cent. has been stated, so that it is fair to ask if anyone could possibly be sure that all the abscesses had been reached and evacuated by the aspirator, and if not, as often occurs, cure results, is it not perfectly obvious that the abscess, which escaped the needle, has recovered, thanks to the emetine, which even the most surgically minded uses in association with his aspirating needle. If this is so, why put the patient to the pain and inconvenience of aspiration? Why not leave all the duty to nature and emetine?

In conclusion I would add two further points which my experience has taught me: (1) That emetine gr. 1

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for 12 consecutive days is not the best method of giving the drug in liver abscess cases or for dysentery.

(2) That the larger the abscess and the longer it has lasted the easier, relatively, it is to cure with emetine only.

I am yours faithfully,

V. S. HODSON.

LONDON, W., March 19th, 1926.

The Editor of *The Lancet* submitted Dr. Hodson's letter to Dr. Manson-Bahr, who replied as follows:—

"Dr. Hodson is correct in stating that many observers agree with him that emetine therapy acts beneficially in liver abscess and that it has sometimes appeared to have rendered operative interference unnecessary, but it is extremely difficult, as I think most men who have had sufficient experience will agree, to distinguish actual formation of amœbic pus from an amœbic hepatitis, in which invasion of the liver tissue by entamœbæ without pus formation has taken place. Aspiration is the only method capable of settling this question. The actual performance of aspiration is a simple matter and is certainly not attended with any more risk than the tapping of a pleural cavity; it is certainly a method equal in its diagnostic importance and therapeutic effect.

"The question at stake is the size of the abscess or abscesses and the results of the absorption of such a large amount of toxic matter on the individual. If a grave degree of toxæmia is present, as is usually the case, the sooner the pus is evacuated the better for the patient. It seems to me a very untherapeutic attitude to force an already toxic subject to absorb a large amount of dead tissue from his liver through his lymphatic channels, when a much more rapid and pleasant method is at hand. A liver abscess may be comparatively trivial or it may be a very serious disease. When there has been formation of a large amount of pus (four pints or more), respiration is severely hampered and displacement, with consequent embarrassment, of important organs, such as the heart, may take place (as in a very serious case under my care at the present time).

"Surely Dr. Hodson does not credit emetine with such miraculous qualities that a few grains will suffice to dispel several pints of dead tissue and thereby relieve pressure on vital organs, nor can it possibly lessen the amount of septic absorption which is taking place. The cases quoted in my original paper with Dr. Morris (*The Lancet*, January 9th) are two specific instances where, firstly, emetine therapy had failed to prevent the recurrence of an abscess, and, secondly, had failed to prevent the re-accumulation of pus in an abscess which had already been drained.

"It is probably unwise to dogmatise at present on the action of emetine in abscess of the liver. Other drugs act in a similar mysterious manner; quinine does not cure every case of malaria, nor salvarsan every case of syphilis; but to assert that the larger the abscess and the longer it has lasted the easier it is to cure with emetine, appears to be in direct contradiction to clinical experience."

Reviews.

THE MEDICAL ANNUAL, 1926.—Bristol: John Wright and Sons. cill plus 616 plus 159 pp. Profusely illustrated, and with many colour plates. Price, 20s. net.

THE MEDICAL ANNUAL is something which no medical practitioner should be without. In collected form, very fully indexed, and most profusely illustrated, written by a large number of the leading authorities in Great Britain on the subjects concerned, it presents a review in concise form of the advances in medicine and surgery of the year, in a form which no amount of

scattered reading of journals will render available to the medical man. And it is marvellous value for the price charged; nothing but a very wide circulation could enable such a volume to be produced at 20s.

The issue for 1926 follows upon the usual lines. In the introduction comes a brief review of the outstanding events and discoveries of the year. Then comes the "Dictionary of Practical Medicine" by many contributors; amongst whom we may note Professor Hey Groves who deals with orthopædic surgery; Colonel L. W. Harrison, who deals with venereal diseases; Dr. Thurston Holland, with radiology; Dr. Robert Hutchison, with gastro-intestinal disorders; Lieutenant-Colonel A. E. J. Lister, i.m.s. (ret'd.), with eye diseases; Dr. Graham Little, with skin diseases; Mr. Lockhart Mummery, with rectal surgery; Sir James Purves-Stewart, with diseases of the nervous system; Sir Leonard Rogers, with tropical diseases; Dr. J. D. Rolleston, with acute infectious diseases; Dr. Rendle Short; Sir Ireland de Courcy Wheeler, and Dr. W. H. Wynn. These few names alone, out of a much longer complete list of contributors, shew the very high standard of the volume.

The sections on tropical diseases will be the ones which will most interest medical men in this country. To say that they are written by Sir Leonard Rogers means that they are replete with accurate and recent information; especially noteworthy is the full review of recent advances in our knowledge with regard to kala-azar. Recent advances in leprosy are also fully dealt with. The section on diabetes is written by Dr. Hugh Maclean, and is one which will be of special value to practitioners in India.

Of outstanding features of the volume, the very numerous advances in surgery are of special interest. Skin diseases dealt with are numerous and accompanied by numerous well executed plates. The review of recent advances in pharmacology and general therapeutics by Dr. Ivor J. Davies is full of information, whilst Drs. MacIlwaine and Boyd Campbell review Professor Cushny's recent book on digitalis, an article which affords clear and precise indications for its use and administration.

It is impossible to review the Medical Annual adequately in a short note; but special attention may be drawn to the article on cancer by Sir W. I. de C. Wheeler; here we have the whole of the enormous recent advances in our knowledge of this subject presented in a nutshell. An excellent article also is that by Dr. W. H. Wynn on the common cold,—one of those few universal scourges of humanity in the face of which the medical profession is still almost helpless. In general he concludes that we may have two different types of the common cold; one epidemic and acutely infectious, and possibly due to a filter-passing micro-organism; the other more chronic, latent and less infectious, and especially associated with catarrhal and septic cocci. The trend of evidence seems to shew that prophylactic inoculation, either at the beginning of the winter, or periodically during the winter months is of value.

In the final section much miscellaneous information is given in over 70 pp. The editor's table of new inventions and preparations is always of great interest. Finally a word must be said with regard to the advertisements; these give the practitioner a wealth of information which he can nowhere else obtain.

The whole volume, which is the 54th annual issue, represents an advance, even upon its excellent traditions of the past.

AVIATION MEDICINE.—By Louis Hopewell Bauer, A.B., M.D. Baltimore: The Williams & Wilkins, Co., 1926. English Agents, Baillière, Tindall & Cox, London. Pp. XVI plus 241, with 35 plates. Price, 34s. net.

"AVIATION MEDICINE" is a new subject. These are the first words of the preface of this very excellent book.

A new subject in medicine rather appals the reviewer, and it is with a feeling almost of hostility that he approaches the study of these pages.

This feeling rapidly changes to one of admiration for the method and skill with which the subject is presented, while finally he realises that indeed here is a medical subject of immense importance, great interest, and one that already rests on a strong basis of experimental evidence and fact.

The work is based on the methods used at the School of Aviation Medicine of the United States Army and therefore deals chiefly with those physical qualifications which the flying man should possess, the effects of the peculiar conditions to which he may be subjected and the various protective devices which have been found necessary for his safety.

The section on the selection of the flier is very complete. The importance of very accurate eye tests is self evident, but also neuro-psychic factors, reaction times and many other mental and physical states are examined and tested by various devices which have been invented for these purposes.

The second section deals with the physiology of aviation. It is of great interest and here is condensed the vast amount of information that has been accumulating during recent years on this subject.

The latter part of the book deals with protective devices, the special duties of the flight surgeon, aviation accidents and even a chapter on airplane dope poisoning.

The whole subject is delightfully presented and very well written. The title perhaps is not well chosen and one feels doubtful of its grammatical correctness.

The book cannot fail to be of interest to any scientific man and more especially to the physiologist, the neurologist and the ophthalmic surgeon.

ABDOMINAL AND PELVIC SURGERY FOR PRACTITIONERS.—By Rutherford Morison, Hon. M.A., & D.C.L., Hon. LL.D., M.B., F.R.C.S. (Edin. & Eng.), Consulting Surgeon, Royal Victoria Infirmary and Dental Hospital, Newcastle-on-Tyne, etc. London: Humphrey Milford. Oxford University Press, 1925. Pp. 212, with 9 illustrations. Price, 8s. 6d.

"The object of my small book is to suggest to practitioners by gleanings from my experience, some points which I hope may be helpful to them." Every surgeon knows the position which Professor Rutherford Morison has occupied for many years in the field of surgery. His experiences, however briefly stated, cannot but be of great value to a younger generation. The author further states that "there are still, in this country, thousands of lives lost annually from abdominal injuries and diseases, because an operation has not been done in time to stop hæmorrhage, to prevent or arrest sepsis, or to remove a focus of disease"—a terrible indictment, but without any doubt quite true. Early diagnosis is the great essential to remedy this state of affairs.

The book is full of aphorisms and illustrations by case-histories of the things that correctly interpreted may mean life and wrongly interpreted may mean death to the patient.

We commend "Abdominal and Pelvic Surgery for Practitioners" to all who practise medicine and surgery. It is a handy book to have on one's table and to read a chapter of now and then. In this way one better appreciates the wealth of experience that has been drawn upon in writing the book.

A MANUAL OF EMERGENCIES.—By J. Snowman, M.D., M.R.C.P. (Lond.). Second Edition. London: John Bale, Sons & Danielsson, Ltd., 1926. Pp. 361. Price, 10s. net.

The first edition of this book, published in 1919, was based on Lenzmann's "Emergencies" and dealt mainly with dangerous emergencies which threaten life. The scope of the second edition has been considerably extended and all forms of other emergencies such as

fractures, dislocations and other morbid conditions have been included. The utility of the book is therefore considerably enhanced. The book is printed on thin paper and forms a very useful and handy volume for students and medical practitioners.

THE BRITISH DRUG HOUSES' BOOK OF ANALYTICAL REAGENTS STANDARDS.—London: The British Drug Houses, Ltd., 1926. Pp. 111. Price, 2s. 6d. Special price to all users of B.D.H. Chemicals, 1s. 6d., postage 3d. extra.

This is a very useful volume for all engaged in scientific work. Its object is to provide a definition of purity of chemicals used for scientific purposes in which purity is of great importance. It is well known that the British Drug Houses, Ltd., manufacture analytical reagents and chemicals used in research and teaching, and in this book the standards of purity used by this firm and the practical methods of determining these standards are given in detail. This volume is really an extension of the "List of Reagents for analytical purposes" prepared during the war at the instance of the Institute of Chemistry and the Society of Public Analysts. Many drugs now used for scientific purposes have been added and additional tests are given for those that were already included. The book is very useful and should be in the possession of every laboratory worker.

ASTHMA AND ITS RADICAL TREATMENT.—By James Adam, M.A., M.D., C.M., F.R.C.P. & S. (Glas.). Second Edition. London: Henry Kimpton, 1926. Pp. 224. Price, 12s. 6d. net.

Since the publication of the first edition of this book in 1912, a large amount of literature has been published relating to asthma and allied conditions and much valuable work has been done. The second edition of this book has therefore been overdue. Though the introductory chapter has not been altered much, most of the book has been re-written and such phenomena as allergy and anaphylaxis are discussed. The author believes most cases of asthma to be primarily due to a toxæmia accompanied by irritability of the vagus and the structures to which it is related. Spasmodic constipation is a common factor in its production. Endocrine disturbances are less a cause than an effect of the toxæmia. The thyroid gland is intimately related to the problem of asthma as its disturbances are often associated with asthma. The value of small doses of thyroid gland extract in treatment is suggested. In the last chapter treatment is briefly discussed and the appendices give full directions regarding diet recommended for the asthmatic. The book is interesting reading and is well worth perusal.

A TEXT-BOOK OF DOMESTIC MEDICINE AND SURGERY.—By G. T. Wrench, M.D., B.S. (Lond.). London: J. & A. Churchill. Pp. 339. Price, 6s. net.

This is an excellent little book, well put together, and well planned. From the point of view of the practitioner in the tropics, it is also of interest in that the author is a medical man with considerable tropical experience, and the chief tropical diseases are dealt with on sound lines.

Presumably the "cave man" or his ancestors were the first people to try "domestic medicine"; but what the patient of to-day often requires to know is when it is necessary to call in the doctor, and when it is safe to do without. One cannot sometimes avoid sympathising with the mental attitude of the patient with a trivial complaint who seeks the chemist rather than the medical practitioner for treatment. In this respect the book is excellent; there is no compromise in its teaching of the necessity for thorough medical treatment in venereal diseases, and for skilled examination in cases of possible malignancy. The book in fact is one which a doctor can recommend to his patients.

Its general scope, after an introductory chapter, is to deal with sudden and acute fevers; gradual and prolonged fevers; fevers with characteristic signs, such as a rash; diseases not characterised by fever; diseases of different parts of the body; accidents and first aid. Pages 67 to 92 are excellent; they give clear, detailed and full instructions how to nurse, diet and manage a case of typhoid fever, an account which will be of special value to many lay persons in the tropics who are called upon to nurse such cases in the absence of skilled assistance.

Tropical diseases are dealt with briefly, but on sound lines; for instance the instructions with regard to dog-bite are good. In connection with snake-bite the author does well to insist on the administration of adequate quantities of antivenene. In connection with scorpion bite his treatment is perhaps more drastic than is necessary; an application of liquor ammoniac, or—if feasible—a hypodermic injection of novocaine will afford immediate relief; incision and rubbing in of permanganate crystals is usually unnecessary.

On the whole, however, the book is one to be welcomed, and is one which is likely to prove popular.

APPLIED BIOCHEMISTRY.—By Withrow Morse. Philadelphia and London: W. B. Saunders Co. Pp. 958. Price, 32s. 6d. net.

THE author of this volume presents the important subject of biochemistry from its practical view-point, and the book deals with applied biochemistry in its true sense. The subject is treated not only from the chemical side, but its physiological aspects are also fully discussed. The first chapter deals with "man and his environment" and in this the H-ion-concentration, its methods of determination and the critical regulation of the reaction of the body which is maintained at practical neutrality are fully discussed. The second chapter deals with the "promoters of chemical action" and the latest developments regarding the action of enzymes are given. In the third chapter "the body and its maintenance" are dealt with and the author takes into consideration the rôle of various foods and their fundamental chemical structures. The fourth chapter deals with glucosides, their chemistry, their optical activity and rôle of alpha, beta and gamma sugars in the animal organism. Chapter five deals with the latest work on lipoids and chapter six with proteids, their principal groups, their physical and chemical structures. Chapter seven deals with special chemistry of the tissues. The subsequent chapters, eight to eleven, deal with the chemistry of common food-stuffs, their digestion and absorption and their fate in the body. Chapters twelve, thirteen and fourteen deal with nutrition from the chemical standpoint. The author describes five different kinds of vitamins and deals with the subject of avitaminosis and the relation of vitamins and internal secretions. The last three chapters deal fully with the chemistry of the urine and blood in all their practical details. The appendix at the end of the book, consisting of more than 50 pages, gives all the practical points regarding the preparation of standard solutions and reagents which are being constantly used in practical biochemistry. The book is very well written and we can confidently recommend it to students of biochemistry and medicine as well as to medical practitioners.

LACTO-BACILLUS ACIDOPHILUS.—By N. Kopeloff, Ph.D. Baltimore: The Williams & Wilkins Co., 1926. English Agents, Baillière, Tindall & Cox, London. Pp. XII plus 211, with 4 plates. Price, 22s. 6d. net.

THIS work represents an extensive study of the interesting *Bacillus* (or *Lactobacillus*) *acidophilus*. It comprises a review of investigations of the organism, a comparison between its characteristics and those of *B. bulgaricus*, and detailed observations of its action when introduced into the gastro-intestinal tract and of the advantages of its use in certain disorders.

L. acidophilus, in distinction to *L. bulgaricus*, can be easily implanted in the human intestine, as a result of

which the reaction of the intestinal contents becomes altered and the flora changed from a proteolytic to an aciduric type with benefit in cases of constipation, diarrhoea, and other allied disorders.

The nature of these effects would seem to be bacteriological rather than physical or chemical.

Details of the experiments from which the above conclusions are derived are presented in an interesting manner.

There is an appendix containing sections on the preparation of acidophilus milk, on temperature studies on acidophilus milk and on the use of modified Gram stains.

The work may be recommended to the attention of practitioners in climates such as this where so many are victims of various gastro-intestinal disorders.

TECHNICAL EDUCATION.—By J. C. Ghosh, B.Sc. (Manchester), F.C.S. Calcutta & Simla: Thacker, Spink & Co., 1926. Pp. 316. Price, Rs. 4-8.

THE author says in the preface that his book presents in collected form the articles written by him on technical education generally and on chemical and pharmaceutical education particularly in various papers and journals. The author is one of the pioneers of technical education in India and is Principal of the School of Chemical Technology; he can therefore speak with authority on this subject. He has specially interested himself in the chemical and pharmaceutical aspects of Indian indigenous drugs and has done much to bring to the notice of the general public the economic side of the drug resources of India. In this book the author has devoted nearly a whole chapter (IV) to medical research and pharmaceutical education in relation to indigenous drugs. In the first few chapters the author deals with the evolution of technical education in this country and the vocational education on caste lines. He draws a distinction between artisan training and that for the more educated type of student who should be destined to be in charge of artisans. He rightly observes that these latter should be well versed both in theory and practice.

In chapters V and VI the author gives some practical suggestions as to the directions in which technical education may be developed in this country. The two subsequent chapters deal with the prospects of chemical technology and how technical education can equip young men to earn their livelihood. The appendices are very interesting and in these the latest particulars regarding the all-India and provincial services, commerce, trade and industry are given, the information being obtained from reliable sources, chiefly from the Government of India publications. The book contains a lot of valuable information and we can confidently recommend it to parents who are looking for suitable professions for their sons.

Annual Reports.

ANNUAL REPORT OF THE GOVERNMENT CINCHONA PLANTATIONS AND FACTORY IN BENGAL, FOR THE YEAR 1924-25. BY C. C. CALDER, OFFG. SUPDT., CALCUTTA, BENGAL SECRETARIAT BOOK DEPOT. PRICE, Re. 1-2-0.

MR. CALDER's review for the year contains a very interesting review of the world situation with regard to quinine and the cinchona alkaloids. There is often a tendency to blame the Kimo monopoly for the high price of quinine, to state that the supply is not equal to the demand, and that prices are not kept down sufficiently to enable quinine to reach the masses. The actual state of affairs, as he shews, is otherwise.

"Affairs in the cinchona and quinine trade show no outstanding developments during the year," he writes, "but a conscious effort through the medium of a Committee of the League of Nations to focus public and international opinion on the problems of future supply at reasonable rates is worthy of record. The fact of such a subject being referred to a body of such standing may be taken as evidence of an awakening consciousness of responsibility towards the welfare of those vast fever-stricken populations of the world to whom quinine is little more than a name.

The importance thus emphasized of an abundant and cheap supply of the drug has elicited a volume of opinion expressed in the press and elsewhere on the reasons for the present shortage and on the policy necessary to increase the supply and to bring it within the reach of the millions. The opinion is almost as divided as it is diverse. It ranges from aspersions on the combine to expressions of despair at the attitude of the sufferer who would confine his treatment, prophylactic and therapeutic, to the wearing of charms. It sees a solution or partial solution of the difficulties of supply in a modification of medical opinion as regards the relative value of the different alkaloids in the bark, in an alteration of the ratio now fixed for distributing profits between planters and manufacturers, and in a reduction of costs by the substitution of a half purified febrifuge containing all the alkaloids for quinine.

Much of the opinion is enlightening on one or more aspects of the quinine shortage problem. All of it, consciously or otherwise, admits the need for action resulting in an increased supply at rates possible for world buyers.

Against the advice to increase supply by the introduction of cinchona to areas not yet tried stands the position of the quinine trade as statistics to-day reveal it. There is on the one hand a vast impoverished malaria-stricken population in the world calling for the remedy, and on the other the remedy at a price and in quantity not merely beyond its reach but beyond the full purchasing power of the richer nations of the world.

From the commercial point of view there is no quinine shortage problem. In this sense there is a drug in the market. Planters and manufacturers both fail to dispose of all their products, and bark and quinine stocks awaiting a market continue to mount up.

These are conditions that suggest overproduction rather than shortage. In view of the world's urgent need for quinine they suggest also an economically unhealthy state of the industry.

Blame for all this condition of affairs has been freely ascribed to the combine, but before it is condemned it may be matter for argument whether a very much worse state would not now prevail but for the fact that a combine arose to organise and direct the economic relationships of the industry. In order to appreciate the present position properly it is necessary to go back to examination of the conditions that prevailed some few years before the outbreak of war. The price per unit of quinine in bark was then but a fraction of that now quoted. A policy of unrestricted competition had already brought thoughtful planters and investors to doubt the wisdom of continuing cultivation of the cinchona tree, and, indeed, there was evidence of areas of this cultivation already giving place to the cultivation of more profitable products. A condition of affairs parallel in all but one sense to the conditions that faced the Ceylon planter in the 'eighties of last century had arisen. The earlier cause was overproduction on a stupendous scale while the root cause of the latter was a slight commercial overproduction combined with lack of organization on the part of the Java planting community. Ceylon found its answer to the situation in the cultivation of tea, Java its answer in the combine. The immediate relevant point is that, had the combine not been formed, history might have repeated itself with results far more serious than those now discussed under the mistaken title of quinine shortage. It should be recalled that the alternative course for Java would have brought on the world a quinine shortage as real

in the commercial sense as in the sense of real need and would have done so on a world that knew Java as the best and almost the only home for the economic production of the drug. When, therefore, there is inclination to blame the combine for the present so-called shortage and inflated prices, it is well to remember what the alternative to the combine might have resulted in and to speculate on what prices might have been reached in the absence of its controlling power.

Meantime the planter is not more than satisfied with the returns he obtains for his bark and the manufacturer points to increased costs in all directions to warrant the proportion of net profits allotted to him from the industry. Both claim, and one must admit the relevance of the fact, that in comparison with other commodities the price of quinine is not so vastly above the cost of its production as to attract capital to the industry. The reason for this may well be that capitalists already seeing overproduction in the commercial sense feel chary of supporting an industry so hazardous as that of cinchona cultivation. The whole chequered history of the industry suggests the need for foresight and organisation as well as the application of the best known scientific methods. It is not unnatural that capital should feel timid.

But the reasons may lie deeper in an as yet unexpressed belief that the production of quinine is already sufficient for the needs of those who can afford to pay a price sufficient for the economic stability of the industry, and that the success of further production would depend on the dubious support obtainable from the philanthropic activities of Governments.

There is something tragic in correlating such a view with the statistics of mortality from malaria in India and with figures representing the incidence of the disease in Russia. It is estimated that in 1920 deaths from this cause in India amounted to 1,300,000 and that in Russia during 1923 there were ten million cases of malaria.

The most interesting and important problem of the whole situation lies in determining whether an anti-malarial remedy from cinchona can be produced at a price sufficiently low to reach the millions, and in this connection an analysis of costs by Heer C. M. Pleyte d'Ailly, Managing Director of the Kina Cultuur Maatschappij, is of special interest. Heer Pleyte d'Ailly claims, in order that cinchona may be saved displacement by other crops in Java, that a minimum unit price of 10 Dutch cents must be secured to the planter, and that, in order that the manufacturer may have a reasonable return on his capital, a minimum of 8 Dutch guilders must be secured per kilogram of quinine extracted. Expressed in Indian currency this means that quinine would have to fetch about Rs. 14 per lb. to save the industry from displacement. This figure may be criticised as high, but it should be remembered that the accounts presented in this report are not commercial in the strict sense, and that various liabilities avoided by a department financed directly by Government would rest on the same industry supported by private enterprise.

Let us, however, assume that Heer Pleyte d'Ailly's figures of cost are higher than the case warrants and strike a figure of Rs. 12 per lb. for quinine and then put the question whether the financial conditions of the mass of India's malarial population can be expected by unaided purchase to maintain the industry on an economic basis at this figure. It is feared that those best qualified to judge the income and responsibilities of the average Indian victim would answer in the negative.

The net conclusion reached would seem to indicate that quinine at a price based on and of the order of the cost of its production is still well beyond the reach of the great malaria-stricken populations of the world.

Decision therefore on the question whether the maintenance of the worker in a state of better health is worth to industry or the State, the cost it would entail will probably be the determining consideration for the extension of cinchona cultivation on any considerable scale. In this connection it is interesting to follow the

trend of public opinion in India as expressed through the new Legislative Councils. The supply of quinine and its availability at rates within the purchasing power of the masses tends more and more to become a question of political importance. There is a widespread and not unnatural objection to viewing the only known remedy for malaria as a luxury for the rich. The cry is for quinine for every victim. The interest evinced is worthy of the importance of the subject. If it supplies the impetus to an effort at solution commensurate with the magnitude of the quinine shortage problem, no humanitarian will grudge public opinion its success.

Turning to the main body of the report, the area under cinchona at the end of the year was 3,060 acres. No extension of any importance was carried out at Mungpoo and Munsong, but other ranges have been explored with the result that an area of about 600 acres has been found in the Latpanchor forest with conditions sufficiently favourable to justify the cultivation of experimental plots.

The quantity of cinchona harvested during the year was considerably less than in the year 1923-24. This appears to have been due to the large stocks of bark already held at the factory as the total quantity of bark worked up at the factory was some 54,000 lbs. more than in the previous year. Rather more than half of this bark was Java bark belonging to the Government of India.

The quantities of quinine sulphate and other alkaloids prepared from provincial bark were almost the same as last year, the figures being 19,230 lbs. of quinine sulphate and 8,348 lbs. of other alkaloids. There was a considerable increase in the total outturn of the factory, but this was in products from Java bark.

The manufacture of quinine tablets for sale through post offices has been transferred from the Juvenile Jail, Alipore, to the Presidency Jail. Machines for the manufacture of these tablets have been ordered and will be installed at the Mungpoo factory. The manufacture of the tablets will then be transferred to Mungpoo. Provision has also been made for the erection of ferro-concrete tanks for storing quinine in the crude form, as storage in tins has been found unsatisfactory.

The financial results were again satisfactory, although the surplus receipts over expenditure fell from Rs. 4,56,825 in 1923-24 to Rs. 4,42,934 in the year under report, and the value of stock at the end of the year was almost Rs. 30,000 less than at the beginning. The total expenditure was Rs. 3,33,626, being slightly lower than in the previous year. The receipts including the jail share for the sale of quinine tablets were Rs. 7,76,560 and were some Rs. 16,000 less than in 1923-24.

Although the quantity of quinine salts supplied to dispensaries and District Boards in Bengal increased by more than 1,600 lbs., there was a decrease of more than 3,300 lbs. in the total quantities sold. This decrease was compensated for by an increased demand for cinchona febrifuge, to meet which 5,000 lbs. had to be obtained from Madras. The price of quinine sulphate fell during the year from Rs. 28 to Rs. 24, and there were similar reductions in prices of other products.

PUBLIC HEALTH REPORT, BENGAL, FOR THE YEAR 1924. BY MAJOR A. D. STEWART, M.B., F.R.C.S. (EDIN.), D.T.M. & H., I.M.S., OFFG. DIRECTOR OF PUBLIC HEALTH, BENGAL. CALCUTTA: BENGAL SECRETARIAT BOOK DEPOT. PRICE Rs. 6-11-0.

This report is perhaps chiefly remarkable for its introductory section. Taking as his text the presidential address of Mr. U. Yule to the Royal Statistical Society, Major Stewart discusses the relationship of food supply and population. It has been shewn, amongst others by Professor Raymond Pearl, that the general curve of natural increase of a population within self-limited limits follows certain laws. Given an absence of famine, great wars, or other conditions likely gravely to affect the figures for population, and given steady peaceful

conditions, the population of a given country increases according to a logarithmic curve. At first, with scanty numbers the increase is slow; later, with abundant food supply and rapidly increasing numbers, the increase of population is very rapid; lastly, however, food supply tends to become inadequate, and the curve of increase now becomes very slow; it may even drop. If we turn to old established countries, Great Britain is still in the second stage; France, with an almost stationary population and a death-rate and birth-rate which approximate to one another, at the third stage.

How do such considerations affect India? Figures at present are too scanty and over too limited a period of years to say. But it is obvious that for this country stability is the great desideratum,—stability in its economic, political and social life. Given co-ordination, co-operation, and absence of such factors as wars and famines, an increasingly widespread knowledge of the first principles of public health, an improvement of agricultural conditions, and the status and prosperity of India is bound to increase enormously. Her resources are almost unlimited; she is still probably only on the first portion of the curve.

Yet certain points require the close attention of the public health official. With regard to epidemic and infectious diseases we may trace the influence of certain factors; it is with regard to these and as regards a foreknowledge of their influence that the public health official should be informed. First, we have secular trends; thus certain diseases shew a steady decline in incidence and mortality from decade to decade, as with phthisis in Great Britain. The factors which go to making up this trend may be complex, but their united influence is clearly felt and shewn. Secondly, certain diseases run in epidemic cycles and tend to recur at definite intervals in epidemic form; the regular recurrence of epidemic small-pox at five-year intervals and of epidemic cholera at five to six-year intervals in Bengal are instances. Thirdly, most of the epidemic diseases shew a very definite seasonal incidence. On the other hand some epidemics, such as the great influenza pandemic of 1917-1918 appear like a bolt from the blue without warning. With regard to the first three classes of epidemic disease the public health official will do well to study the history of the past, to anticipate events, and to take measures beforehand.

Turning to the main body of the report, the provincial birth rate in 1924 was 29.5 per mille as compared with 29.9 in 1923 and the quinquennial average of 28.3. The North-West Frontier Province and Burma returned lower birth-rates than Bengal. The aggregate birth-rate of the towns of Bengal during 1924 was 19.6 per mille against 20.4 in 1923, showing a decrease of 3.9 per cent. In this connection Major Stewart points out that "these low birth-rates indicate sheer neglect on the part of the municipal authorities to administer the Births' and Deaths' Registration Act. Although registration of births is compulsory in towns, yet it is regrettable that in spite of serious efforts on the part of the Public Health Department, repeated from year to year, the local bodies with the exception of a few have failed to have any appreciation of their responsibility in this matter—a factor so essential in estimating the effect of measures undertaken to improve the public health."

The provincial death-rate in 1924 was 25.9 per mille as compared with 25.5 in 1923, the quinquennial average being 29.6 per mille. Madras and Burma returned lower death-rates than Bengal. The death rate of 1922 was lower than that of any year since 1890. The death-rates of the triennium preceding 1922, when compared with those of the last three years, show a decided improvement, but there are nevertheless signs of steady increase in mortality. Major Stewart remarks as follows:—

"That there is a close connection between economic conditions and public health is universally recognised, but the mechanism of relationship is not apparent. On the one hand are ranged rainfall, the extent of cultivation, the class and variety of crop, the yield per acre,

the total harvest and the current prices of the commodities, and on the other hand the prosperity of the individual, death-rates and birth-rates and mortality. Speaking generally, prosperity results in a lowered death-rate, an increased birth-rate, and a natural increase of numbers.

"In Western and Central Bengal, the harvest is mainly rice, much of which is used for local consumption. Speaking generally, a large harvest brings increased prosperity, more food and better health. The amount of rice harvest is dependent on the amount and the distribution of rainfall, which vary from year to year. In this part of Bengal it is found—(a) that over a period of 30 years the trend of natural increase of population closely follows the rice production for the whole province; (b) that there is a close correspondence with the yield of rice per acre and the birth-rate, and (c) that the mortality diminished with good rice harvests and increased with poor rice harvests.

"In Eastern Bengal, however, these relationships with rice harvests do not occur, in fact the relationships are rather reversed. The explanation probably lies in the different class of crop grown in Eastern Bengal, viz., jute. The demand for jute is a world-wide one, and the price of jute is therefore often determined by factors outside of Bengal. Falling jute prices, moreover, are often associated with good harvests, a good harvest does not therefore mean increased prosperity, as a good rice harvest does to the people of Western and Central Bengal. Conditions therefore tending to favourable vital occurrences in Western and Central Bengal may tend to unfavourable vital occurrences in Eastern Bengal and *vice versa*, so that it is necessary to appreciate these differences in economic and agricultural conditions before drawing conclusions as to the health conditions in the different parts of the province. On the whole, however, the conditions governing the production of jute are not so liable to fluctuations as those of rice production, and these vital occurrences tend to be more stable in Eastern than in Western and Central Bengal. The desideratum is the stabilisation of both rice harvests and of death-rates, and it would appear that the stabilisation of one would produce a similar effect on the other."

Registration of births and deaths.—Major Stewart again draws attention to the continued neglect by municipal authorities in administering the Registration of Births and Deaths Act.

Infant mortality.—During the year 252,337 infants died under the age of one year, as compared with 253,694 during the preceding year, the total mortality showing a net decrease of 0.5 per cent. The rate of infant mortality, however, increased from 182.1 per mille in 1923 to 184.2 per mille in 1924.

In 1924, 1,972 deaths from childbirth were reported, but the figure is not reliable and the Director of Public Health estimates that this figure should, in fact, be much higher.

In comparison with the preceding year, the still-births showed an increase of 3.3 per cent. In showing the proportion of still-births to total births in districts the Director of Public Health states that "however unreliable the registration of still-births may be, it is obviously apparent that in many of the districts still-births occur in the proportion of 1 to every 12 to 16 births. The District Health Officer of Khulna ascribed still-births to the inefficiency of the ignorant country *dais* to resuscitate an asphyxiated child born after a prolonged and difficult labour, the child being thus left as dead on account of its not crying after birth. It is therefore essential that the district boards should seriously consider the question of training country *dais* and thus reduce the number of still-births."

Some district boards and municipalities actually started classes for the training of *dais* in 1923. The opening of such classes is encouraged by the offer of small subsidies from government.

Cholera.—There were 48,514 deaths from cholera in 1924 against 41,483 in 1923, showing a death-rate of

1.04 against 0.89 per mille of the population in the previous year and 1.5, the mean for the previous five years. Although the mortality from the disease was greater than in 1923, the decline on the average of the previous quinquennium was thus easily maintained. The Director of Public Health attributes the decrease mainly to the measures taken by the local bodies to cope with cholera epidemics by employing additional temporary sanitary staff. Attention is called to the continued excellent work which such voluntary agencies as the Bengal Public Health Association, the Cholera Brigade of the Central Anti-malarial Co-operative Society and the Bengal Social Service League have done for the prevention of the disease.

The satisfactory results obtained so far tend to show that with the organisation of a properly trained staff and the carrying out in every *thana* of anti-cholera measures, there is every chance of eliminating the disease as one of the chief factors in increasing the mortality of the province. It is gratifying to note that, through the publicity work carried on by the Public Health Department by means of lectures and free distribution of popular literature on the prevention of cholera, the general public are beginning to realize that cholera is essentially a preventable disease. Inoculation against the disease does not appear to be unpopular.

Small-pox.—In 1924 the mortality from small-pox was 5,567 against 4,236 in 1923, 7,861 in 1922, 8,157 in 1921, and 36,190 in 1920. A review of the mortality statistics of small-pox leads to the conclusion that in Bengal a recrudescence of small-pox in epidemic intensity may be expected every five years. The last severe epidemic of small-pox took place in 1919–20 and it was, therefore, apprehended that another epidemic might appear in 1924–25. This apprehension was unfortunately only too well-founded as was shown by the high mortality during the first six months of 1925, though the epidemic was less severe than that of 1919–20.

The total number of vaccinations reported in 1924–25 was 2,662,966 as against 2,057,724 in 1923–24, showing an increase of 605,242 or 29.4 per cent. operations. Of the total operations, 1,655,201 were recorded as primary and 1,007,765 as re-vaccinations against 1,590,576 primary and 467,148 re-vaccinations during 1923–24. There was thus during the year 1924–25 an increase of 4.06 per cent. in primary and of 115.7 in re-vaccination operations.

During the year under review all the districts in Bengal except Tippera, Rangpur and Dinajpur, showed an increase in the total number of operations in comparison with the figures of 1923–24. The increase in Calcutta was due to the prevalence of small-pox in epidemic form during 1924–25. The increase in other districts is also attributable to the same reason as well as to the introduction of free vaccination.

It is satisfactory to note that the supervision exercised by the District Health officers with the assistance of the provincial vaccination inspecting staff contributed in no small degree towards these satisfactory results.

During 1924–25 out of 1,112,074 infants requiring vaccination in the Presidency, 306,344 or 275.4 per mille were reported to have been successfully vaccinated as compared with 302,730 or 262.6 per mille of 1,152,773 infants in the previous year.

Fevers.—In 1924 the mortality from fevers was 912,408 against 909,795 in 1923, showing a ratio of 19.6 per mille in 1924 against 19.5 in the previous year. Deaths from fever as usual represented about 75 per cent. of the total mortality in 1924: deaths from malaria, enteric and relapsing fevers were less common than in the previous year, while mortality from measles, kala-azar and other fevers increased, the increase under kala-azar being greatest (119 per cent.). As compared with the mean for the previous ten years, all the divisions showed improvement in regard to fever mortality during 1924, which was most marked in the Burdwan Division, where the fever mortality was reduced by 30.0 per cent. and in the Presidency Division where it diminished by

19.0 per cent. The Chittagong Division showed a reduction of 10.9 per cent., Rajshahi Division 8.2 per cent., and Dacca Division 1.6 per cent.

As regards the increase of malaria in Eastern Bengal districts Major Stewart remarks as follows:—

"This increase of malaria in Eastern Bengal districts appears to be associated with the great increase of the water hyacinth, an extensive multiplication of village roads raised considerably above the surface of the country and railway extension in certain areas, notably Mymensingh, all resulting in an interference with flow of flood water in the *bils* and water-courses and across the surface of the country."

The experiments carried on in the colliery area (Singaran-Topsi) and at Meenglas in the Duars with a view to reducing malaria were on the whole successful. As noticed in the last year's report, the Banka Valley scheme continued to give good results and effected a further reduction of the spleen index. A flood and flush scheme was in operation at Jangipur, and the results so far obtained were satisfactory.

Kala-azar.—The number of reported deaths from kala-azar was 9,997 in 1924, against 4,565 in 1923, 1,531 in 1922 and 1,552 in 1921. The number of kala-azar cases treated at hospitals, dispensaries and special centres was 139,085 in 1924 against 57,238 in 1923, 13,317 in 1922 and 7,698 in 1921. It is satisfactory to note that several kala-azar centres were opened by district boards during 1924, in addition to those started by voluntary institutions such as the Central Co-operative Anti-malaria Society and the Bengal Health Association.

Sanitary Engineering.—Eight water-supply and sewerage schemes were prepared, and seven detailed projects of municipal water-supply and drainage drawn up by the Chief Engineer, Public Health Department, in 1924. Fifteen water-supply and one sewerage projects were under consideration, two water-supply and one sewerage scheme were completed, and four water-supply and one sewerage project were partially completed during the year under review. The total capital expenditure on water-supplies in 1924 was Rs. 4,28,774, while the total expenditure on municipal drainage and sewerage works was Rs. 4,13,068.

ANNUAL REPORT ON THE HOSPITALS AND DISPENSARIES OF BENGAL FOR THE YEAR 1924. BY COLONEL R. P. WILSON, C.I.E., V.H.S., F.R.C.S., D.P.H., I.M.S., OFFG. SURGEON-GENERAL WITH THE GOVERNMENT OF BENGAL. CALCUTTA: BENGAL SECRETARIAT BOOK DEPOT, 1925. PRICE RS. 8.

DURING the year 31 hospitals and dispensaries were in operation in Calcutta and its environs, 17 of them with accommodation for in-patients. The total numbers treated were 43,055 in-patients and 443,647 out-patients, an increase on the figures for 1923, chiefly due to the abolition of the unpopular system of charging small fees at the out-door departments at the Medical College and other hospitals in Calcutta. Of the chief diseases concerned cholera accounted for 1,213 admissions, almost all of them to the Campbell Hospital; malaria for 42,270 admissions, and kala-azar for 8,133. Small-pox incidence was very low, and influenza unimportant, but the position with regard to phthisis continues to be unsatisfactory; 5,006 patients were treated, 1,177 of them as in-patients. The majority of these cases are late ones with a bad prognosis. Venereal diseases accounted for 19,937 cases, and the Voluntary Venereal Diseases Hospital at Alipore had 587 in-patients during the year; the incidence of gonorrhoea is considerably higher than that of syphilis. Diphtheria accounted for 140 cases with 39 deaths. Selected surgical operations numbered 7,998. "Lieutenant-Colonel J. C. H. Leicester submitted an interesting report on the work done in the Eden Hospital during the year. There were 1,094 cases of confinement with 46 deaths." (We would like to see the annual report of such an important institution as the Eden Hospital, Calcutta, reviewed in our columns, rather than pigeon-holed in a secretariat. The annual reports

of the Madras group of hospitals are always full of interesting professional matter; the Bombay and Calcutta reports, however, do not appear to see the light of print.)

Financially, the total receipts of hospitals of classes I, III and IV in Calcutta amounted to Rs. 27,68,464, of which the Government contribution amounted to 65 per cent. Several donations were made to the Carmichael Medical College, Belgatchia, whilst an interesting donation to the Calcutta Medical College was one of Rs. 2,000 from the well known Namsong Chinese Church in the Chinese quarter of Calcutta, on condition that two beds should be reserved for members of their community. The total expenditure on the same group of hospitals was Rs. 27,20,872.

Turning to the *mofussil*, there were 914 dispensaries at work during the year, with 5,155 beds available; and 6,864,361 persons in all were treated, including 65,762 in-patients. A little more than a quarter of these patients were sufferers from malaria; 48,848 were cases of influenza, 8,454 cases of cholera. The number of kala-azar cases treated rose from 34,264 in 1923 to 76,014 in 1924, chiefly as the result of the opening up of new treatment centres. Phthisis accounted for 7,360 cases, and 3,219 lepers were treated in the three leper asylums in the province. The number of selected surgical operations was 5,831, including 1,066 operations on bones,—a fact which shows the important place held by bone surgery in Indian practice. The receipts for *mofussil* hospitals of classes I, III and IV totalled Rs. 21,63,840, of which local funds contributed 51.4 per cent. as against 12.4 per cent. from the provincial government. The total expenditure was Rs. 19,54,287.

A special feature of the year was the opening of the Pasteur Institute section at the Calcutta School of Tropical Medicine in June, 1924. In the first seven months of its work this institute treated 1,995 patients, and 1,461 completed a full course of treatment, as compared with 1,361 patients from Bengal treated during the full year 1923 at the Pasteur Institute, Shillong. The Lytton Medical School was opened at Mymensingh in July, 1924, with facilities for teaching 200 students. The most noticeable feature of the whole year's work was the opening up of fresh centres for the treatment of kala-azar, and training of medical men in the diagnosis and treatment of the disease.

ANNUAL REPORT OF THE MENTAL HOSPITALS IN BENGAL FOR THE YEAR 1924. BY COLONEL R. P. WILSON, I.M.S., OFFG. SURGEON-GENERAL WITH THE GOVERNMENT OF BENGAL. CALCUTTA: BENGAL SECRETARIAT BOOK DEPOT, 1925. PRICE Re. 1-10-0.

THE three institutions dealt with in this report are the mental hospitals at Dacca and Berhampore, and the mental ward at Gobra. The total accommodation for patients during the year was 1,147 beds, and the total population treated 1,172; in all 224 patients were admitted during the year as compared with 213 in the previous year. A total of 123 patients were discharged during the year, 85 of them definitely cured.

The general health of the patients was good, and the daily average sick rate was 89 as against a corresponding figure of 117 in the previous year. There was a mild outbreak of influenza with one death at Berhampore mental hospital in July, whilst at the same hospital a building in the garden collapsed during a severe hailstorm, killing one patient. Three patients escaped, one from Bhowanipore and two from Berhampore. One was recaptured.

Patients under observation during the year numbered 104, of whom 44 were certified and admitted, and 33 certified but released under Act IV of 1912. Mental criminals numbered 210 at Dacca and 356 at Berhampore. Twenty private patients were admitted during the year and eleven discharged. Financially the total receipts at Dacca and Berhampore amounted to Rs. 2,46,056 and the expenditure to Rs. 2,39,647. A revised scale of pay

was introduced for the keepers at the Dacca hospital, and the observation ward for Indian patients at Bhowanipore was opened in May, 1924, with an additional staff sanctioned for this purpose. It was hoped to transfer the mental patients from the Dacca and Berhampore hospitals to the new Indian Mental Hospital at Ranchi in September, 1925.

THE CALCUTTA DENTAL COLLEGE AND HOSPITAL. ANNUAL REPORT FOR 1925-26.

THIS institution was founded in 1920; and last year it had 32 students on its roll as compared with 22 in the previous year. The course of training given is one of three years, and the Principal, Dr. R. Ahmed, D.D.S. (U. S. A.), writes that he hopes to extend it to four years. The College does a great deal of work among poor patients in Calcutta, whilst patients are also sent to it from some school clinics. It also publishes the *Indian Dental Journal*, a quarterly journal which is well got up, well published, and which often contains items of medical interest.

The income of the institution during the year was Rs. 14,480, and the expenditure Rs. 8,546. As Dr. Ahmed remarks, dentistry in India is still in embryo, and the Indian public get most of their dentistry done by untrained and unskilled workers. The need for such institutions as the Calcutta Dental College is therefore obvious.

Correspondence.

SEPARATION OF THE UMBILICAL CORD.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—It may interest some of your readers to learn that the umbilical cord of a male European infant separated on the 24th day after birth.

The infant was full term but the cord was considerably thicker than the average cord of either a full term or premature infant. It was the thickest cord I have ever seen.

A few days after birth it was noticed that the child was not thriving and had an urticarial rash chiefly over the buttocks, fork, inside of the thighs and arms, chest and lower part of the face and a few days later the skin over the fingers and toes began to peel.

About the tenth day "green diarrhoea" started and the infant had to be kept on water and albumen water plus medical treatment.

On the twenty-third day the child was better but still on water and albumen water plus medical treatment.

On the twenty-eighth day (to-day) the child was doing well. There is a slight bulging at the umbilicus but it is smaller than when the cord separated.

It would be interesting to learn if an umbilical cord has taken longer than twenty-four days to separate.—Yours, etc.,

C. C. MURISON, F.R.C.S.E.,
Lieut.-Colonel, I.M.S.

BELGAUM,
4th April 1926.

POTASSIUM PERMANGANATE CRYSTALS IN SNAKE-BITE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In the issue of the *Gazette* for April 1926, on p. 178, is reported a case of recovery from cobra poisoning in which potassium permanganate crystals were used locally in the incisions made at the bitten parts with resultant sloughing, and it is in this connection that I write to enquire whether the rubbing in of these crystals is of any real value or benefit in the treatment of snake-bite. Potassium permanganate is a caustic, three grains producing one grain of caustic potash, and

its vigorous application is bound to result in severe inflammation of the tissues encountered; even a one per cent. solution injected subcutaneously stings severely, and it might therefore be asked whether the crystals would achieve any more than the washing freely of the wounds inflicted with a solution of the permanganate.

Another point in this connection is the depth of incision to be made. I have seen free multiple incisions down to bone and even distant from the actual punctures made on the leg and foot of a patient bitten by a snake which was not identified. Now, since the depth of fang penetration is not more than half an inch, it is quite unnecessary to make incisions except over the punctures only, not exceeding two-thirds of an inch in depth, and since the venom is diffused in the tissues, it would be useful to massage the parts, with a view to pressing the venom on to the surface of the wound, which should be freely irrigated with a solution of potassium permanganate; say a grain to an ounce. This will be sufficient to render inert any of the venom it comes into contact with, at the same time not damaging the tissues and not producing sloughing, with later deformity of the parts.

Since only two foreign substances have been in contact with the tissues—the venom injected and permanganate crystals—and since venom does not produce sloughing, it is only logical to conclude that it is the caustic employed that is responsible for the injury done to the patient in one's efforts at saving life.

* I am not touching on the use of antivenene and the application of the tourniquet, both are indispensable; the latter should not be kept on too long, but gradually released, watching symptoms and injecting anti-serum, as required.

I conclude by asking again whether the use of crystals of potassium permanganate is justifiable in the treatment of snake poisoning, instead of a solution as described above.—Yours, etc.,

J. E. LEONARD CHINAL, M.D. D.T.M.
(Bengal).

MONGHYR, E. I. RLY.,
16th April 1926.

Service Notes.

APPOINTMENTS AND TRANSFERS.

In pursuance of the provisions of sub-rule (2) of rule 26 of the Council of State Electoral Rules, the Governor-General is pleased to nominate Major-General T. H. Symons, C.S.I., C.B.E., K.H.S., I.M.S., being an official, to be a Member of the said Council of State.

Colonel F. H. G. Hutchinson, C.I.E., I.M.S., Assistant Director Medical Services, United Provinces District, is appointed Surgeon-General with the Government of Madras with effect from the 22nd April 1926.

Lieutenant-Colonel A. H. Proctor, D.S.O., M.D., F.R.C.S.E., I.M.S., Civil Surgeon, Darjeeling, is appointed to act as Surgeon-Superintendent, Presidency General Hospital, Calcutta, *vice* Lieutenant-Colonel E. E. Waters, M.D., M.R.C.P., I.M.S., granted leave, or until further orders.

Lieutenant-Colonel C. A. Godson, M.C., I.M.S., Civil Surgeon, Hooghly, is appointed to hold medical charge of the civil station of Serampore, in addition to his own duties, until he goes on leave.

Major W. O. Walker, M.B., F.R.C.S.E., I.M.S., officiating Civil Surgeon, Serampore, is transferred to Darjeeling, *vice* Lieutenant-Colonel A. H. Proctor, D.S.O., M.D., F.R.C.S.E., I.M.S.

Major H. Hingston, M.D., I.M.S., is appointed to act as Professor of Medicine, Medical College, Calcutta, during the absence, on leave, of Lieutenant-Colonel F. A. F. Barnardo, C.I.E., C.B.E., M.D., I.M.S., or until further orders.

Major E. H. V. Hodge, M.B., I.M.S., Surgeon to His Excellency the Governor of Bengal, is appointed to act as Professor of Clinical Medicine, Medical College,

JULY, 1926.]

Calcutta, during the absence, on leave, of Lieutenant-Colonel D. McCay, M.D., I.M.S., or until further orders. Major P. F. Gow, D.S.O., M.B., I.M.S., officiating Civil Surgeon, Murshidabad, is transferred to Hooghly, vice Lieutenant-Colonel C. A. Godson, M.C., I.M.S., granted leave.

Major Gow is also appointed to hold medical charge of the civil station of Serampore in addition to his own duties.

The services of Captain M. L. Treston, I.M.S., are placed permanently at the disposal of the Government of Burma, with effect from the 6th April 1923.

Captain B. H. Singh, M.C., I.M.S., Resident Medical Officer, Medical College Hospitals, Calcutta, is appointed as officiating Civil Surgeon, Murshidabad, vice Major P. F. Gow, I.M.S.

The services of Captain D. Clyde, I.M.S., are placed permanently at the disposal of the Government of the United Provinces.

The services of Captain S. N. Hayes, F.R.C.S., I.M.S., and Captain A. N. Bose, M.B.E., I.M.S., are placed temporarily at the disposal of the Government of Bihar and Orissa with effect from the forenoon of the 31st March 1926 and 1st April 1926, respectively.

The services of Captain M. L. Treston, I.M.S., are placed permanently at the disposal of the Government of Burma, with effect from the 6th April 1923.

Subject to His Majesty's approval, the undermentioned officers have been appointed permanently to the Indian Medical Service, as Lieutenants, by the Right Honourable the Secretary of State for India. Their commission will bear date 20th May 1925:—

1. Som Dutt, M.C. (Captain I.M.S.—T.C.).

Previous mobilized service as a temporary officer in the Indian Medical Service from 24th June 1916 to 19th May 1925 counts for pay, pension and promotion.

2. Dawarka Prasad Bhargava, M.B., F.R.C.S.E. (Captain I.M.S.—T.C.).

Previous mobilized service as a temporary officer in the Indian Medical Service from 12th July 1917 to 21st September 1920 and from 16th August 1923 to 19th May 1925 counts for pay, pension and promotion.

3. Shankar Parasharam Joshi, M.B. (Lieutenant, I.M.S.—T.C.).

Previous mobilized service as a temporary officer in the Indian Medical Service from 25th May 1923 to 19th May 1925 counts for pay, pension and promotion.

4. Sukumar Dutta Gupta, M.B. (Lieutenant, I.M.S.—T.C.).

Previous mobilized service as a temporary officer in the Indian Medical Service from 7th August 1923 to 19th May 1925 counts for pay, pension and promotion.

5. Kaikhushroo Maneckji Bharucha, M.B. (Lieutenant, I.M.S.—T.C.).

Previous mobilized service as a temporary officer in the Indian Medical Service from 13th October 1923 to 19th May 1925 counts for pay, pension and promotion.

6. Monawar Khan Afridi, M.B. (Lieutenant, I.M.S.—T.C.).

Previous mobilized service as a temporary officer in the Indian Medical Service from 1st August 1924 to 19th May 1925 counts for pay, pension and promotion.

7. Gurbaksh Singh Chawla (Lieutenant, I.M.S.—T.C.).

Previous mobilized service as a temporary officer in the Indian Medical Service from 9th August 1924 to 19th May 1925 counts for pay, pension and promotion.

8. Bhagwant Singh Nat, M.B., F.R.C.S.

9. Chiranjil Lal Pasricha, M.B.

LEAVE.

Lieutenant-Colonel E. E. Waters, M.D., M.R.C.P., I.M.S., Surgeon-Superintendent, Presidency General Hospital, is granted leave from the 3rd May 1926, or any subsequent date from which he may avail himself of it, to the 21st July 1927.

Major J. A. Sinton, V.C., O.B.E., I.M.S., Officiating Assistant Director, Central Research Institute, Kasauli,

is granted leave on average pay for eight months combined with leave on half average pay for four months with effect from the afternoon of the 20th May 1926.

PROMOTIONS

Lieutenant-Colonel to be Colonel.

Lieutenant-Colonel Arthur Brownfield Fry, C.I.E., D.S.O., M.D., vice Colonel Francis Hope Grant Hutchinson, C.I.E., M.B. Dated 1st April 1926.

H. M. Cruddas, C.M.G., O.B.E., vice Colonel T. B. Kelly, D.S.O., F.R.C.S.E., with effect from the 9th March 1926. (Colonel Cruddas tenure of appointment will reckon from the 10th March 1926.)

The promotion to the present rank of Major C. J. Stocker, M.C., M.D., I.M.S., notified in Army Department Notification No. 1069, dated the 3rd August 1923, is antedated from the 29th July 1923 to the 29th January 1923.

Captains to be Majors.

O. R. Unger, dated the 6th February 1926.

N. Briggs, dated the 10th February 1926.

F. R. Thornton, M.C., M.B., dated the 11th February 1926.

RETIREMENTS.

Colonel T. B. Kelly, D.S.O. F.R.C.S.E., V.H.S. 9th March 1926.

Lieutenant-Colonel R. P. Wilson, C.I.E., F.R.C.S., V.H.S. 17th March 1926.

Lieutenant-Colonel W. J. Collinson, M.B. 22nd April 1926.

Lieutenant-Colonel G. McPherson, C.I.E., M.B., F.R.C.S.E., I.M.S. 8th May 1926.

Major R. B. Nicholson, O.B.E., M.C., I.M.S. 28th February 1926.

RESIGNATION.

The Governor-General is pleased to accept the resignation by the Hon'ble Major-General Sir Charles MacWatt, Kt., C.I.E., M.B., F.R.C.S., K.H.S., I.M.S., of his Office of Member of the Council of State.

NOTES.

D. T. M. (BENGAL). EXAMINATION PASS LIST, 1926.

At the examination held at the Calcutta School of Tropical Medicine in April 1926, for the Diploma in Tropical Medicine granted by the Faculty of Tropical Medicine, Bengal, the following 20—(out of 35)—candidates passed:—

With distinction.

Horace Stuart Thomas, M.B., D.S. (Melbourne), Madras.

Passed.

Sydney James Bellgard, D.M.C. (Cal.), L.M.F. (Bengal), Bengal.

Pijush Kanti Bhanja, M.B. (Cal.), Bengal.

Sub-Asst. Surgeon Pasupati Bhattacharyya, L.M.P. (Bengal), Bengal.

Asst. Surgeon Bhaskar Ramchandra Chandorkar, I.M. & S., Nagpur.

Nalini Mohan Chatterjee, M.B., D.P.H. (Cal.), Bengal.

Othniel Immanuel Devadatta, L.C.P. & S. (Bom.), Miraj (S. M. C.).

Asst. Surgeon Baliram Dube, M.B. (Cal.), Nagpur.

Abdul Ghaffar, M.B. (Cal.), Bengal.

Civil Asst. Surgeon Paresch Chandra Guha, L.M. & S. (Cal.), Assam.

Kandapper Kanagarayer, I.M.S. (Singapore), Kuala Lumpur, F. M. S.

Vinayak Krishna Mehendale, M.B., D.S. (Bom.), Bombay.

Miss Ruth Lowe Milne, M.R.C.S. (Eng.), I.R.C.P. (Lond.), Bengal.

Miss Gulbai Pirojsha Patel, M.B., B.S. (Bom.), M.B., B.S. (Lond.), L.M. (Dublin), Delhi.
 G. Raghunatha Rao, L.M.P. (Madras), Madras.
 Sambhu Nath Ray, M.B. (Cal.), Bihar and Orissa.
 Phanindra Nath Sanyal, M.B. (Cal.), Bihar and Orissa.
 Asst. Surgeon Sudhir Kumar Sen, M.B. (Cal.), Bihar and Orissa.
 Asst. Surgeon Ram Singha Sharma, M.B., B.S. (Punjab), Punjab.
 Nautamlal Ratanji Vyas, M.B., B.S. (Bombay), Bengal.

"BILIVACCINS."

THE Indian daily papers are at present being so flooded with press notices of "Bilivaccins" that we consider that the medical profession in this country would do well to take careful stock of the position, before coming to any final conclusions as to the value or otherwise of vaccines with bile administered orally.

As is well known, the idea of immunising the intestinal tract against such diseases as bacillary dysentery and cholera by oral administration of vaccines originated with Professor Besredka of the Institut Pasteur, Paris. On p. 624 of our issue for December 1924, we gave a full précis of the paper read on behalf of Professor Besredka by Dr. Harry Plotz, at a meeting of the Royal Society of Tropical Medicine and Hygiene, and of the discussion which followed that paper—a discussion in which many of the leading bacteriologists in London took part, and which showed a wide divergence of opinions. In vaccination against small-pox the skin plays an important part in that it acquires an immunity against infection which protects the whole body. In connection with "bilivaccins" the whole point at issue is whether oral administration of vaccines plus bile will confer a corresponding immunity on the epithelium of the intestinal tract. This point can be determined in one of two ways; (a) by most careful experimental test on animals in the laboratory; and (b) by extensive use in the field and most careful collection of statistics, with appropriate controls, and with due regard to the conditions of experiment. One of the commonest mistakes made in medicine of late years has been the wholesale use of vaccines at a moment when an epidemic has reached its height and is about to decline. The use of prophylactic vaccines in the recent great influenzal pandemic in India, for instance, has been held to have been of value in checking the pandemic; yet such vaccines were usually introduced at the very height of the epidemic and when the incidence of the disease would tend to fall from natural causes, apart from the use of any vaccine. The recent studies by Malone and others of the use of a very strong anti-pneumococcus vaccine in Indian troops in Baluchistan,—an area where pneumonia is very prevalent during the cold weather,—showed that little or no immunity against the disease was conferred by wholesale vaccination prior to the infective season.

The medical profession in this country would do well, therefore, to discount a good deal of what is being published in the lay papers. On the other hand, if it can be proved that administration of vaccines by the oral route will really protect a population exposed to risk, it is obvious that a tremendous advance will be made in combating such diseases as bacillary dysentery, the enteric fevers and epidemic cholera. The matter, in brief, is of such tremendous importance in the practice of medicine in the tropics, that it would be most unwise to jump to any hasty conclusions.

The value of "bilivaccins" in the field is at present being extensively tested by the Directors of Public Health in Bengal, Madras, and the United Provinces. Experimentally, its value is being tested in the laboratories at the Haffkine Institute, Bombay, and the Calcutta School of Tropical Medicine. At the latter, the report of Capt. G. C. Maitra, I.M.S., Dysentery Research Worker, is as follows:—

"Owing to a scarcity of rabbits, experiments on a large scale were not possible. On 20 animals, however, the conclusions arrived at have been as follows:—

1. Cholera and dysentery (Shiga) bilivaccin, given by the mouth, protect rabbits against lethal doses of these bacilli when given by the blood stream.
2. Protection to any appreciable extent does not appear before the end of the second week after the last dose of bilivaccin.
3. Rabbits receiving half the adult human dose of cholera bilivaccin, 14 days later can withstand at least 2 minimal lethal doses of living cholera vibrios when given intravenously.
4. Rabbits immunised with cholera bilivaccin, and with dead cholera vaccine plus bile prepared locally, behave in the same way when injected intravenously with lethal doses of living cholera vibrios.
5. Animals protected with anti-Shiga bilivaccin die after a protracted illness, when double the minimum lethal dose is injected via the blood stream. The margin of safety in this case appears to be smaller than in the case of cholera."

Major Goyon of the Sanitary Service in Pondicherry, French India, reports on the extensive use of anti-cholera bilivaccin in a local epidemic in November 1925—January 1926. Of 5,200 persons to whom the vaccine with bile was given orally only 2 contracted cholera. The epidemic reached its height between December 15th and 29th, and in all caused 1,039 attacks with 831 deaths. Bilivaccin was introduced in November and December. He notes that in previous local epidemics the local police force have been especially liable to infection, but in this epidemic they were all treated with bilivaccin, and the only case of cholera which occurred was in an absentee who had not received the treatment, (*La Presse Médicale*, 24th February, 1926, p. 254).

It is obvious that the position is a very interesting one; but that it would be unwise to come to any premature conclusions. Further observations are called for. The Indian agent for "Bilivaccins" is G. Loucatos, P. O. Box No. 783, Bombay.

MESSRS. E. MERCK'S ANNUAL REPORT FOR 1925.

WITH reference to our note on this report in our issue for April, 1926, p. 208, we are asked by Messrs. Martin & Harris, Ltd., 8, Waterloo Street, Calcutta—the agents in India for E. Merck—to state that they will be glad to supply a copy of the report gratis to any medical practitioner who applies to them,—mentioning this journal.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

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Original Articles.

EPIDEMIC DROPSY AND SECONDARY ANÆMIA OF PERNICIOUS TYPE.

By H. HINGSTON, M.D.,

MAJOR, I.M.S.,

Officiating First Physician, Medical College Hospital, Calcutta.

Case 1.—S. M. A., a Mohamedan male, was admitted to the Medical College Hospital on January 8th, 1926. He complained of

- (1) swelling of both legs,
- (2) general weakness and shortness of breath,
- (3) difficulty in walking owing to stiffness of the legs, and
- (4) failing vision.

He related the following remarkable history. He had always been healthy and had not previously suffered from any severe illness.

On September 21st, 1925, he visited his relations in their village in the Jessore District of Bengal. The household was a large one consisting of twenty-two persons including the servants and their children. On October 6th, six maunds of rice were brought from a river-side village 3 miles away. This rice was good quality *balam* rice, but had probably been brought to Nohata by boat. The rice caused diarrhoea immediately it was used and after a few days was returned. Another supply was obtained from the same source.

The servant whose duty it was to take back this rice was unable to do so as his legs had become swollen during the previous night, about October 13th. There was no further illness in the household and the patient returned to Calcutta on October 29th. A few days after his return his legs and face became swollen, he was unable to walk and he remained in bed. He heard that almost all the members of his family and their servants were suffering from "swelling" and towards the end of November five of them had died. He, being much better, returned to the village on November 30th. All the remaining members of the household were ill.

In all cases that still survived, the swelling had decreased some time previously, but had been followed by increasing weakness, marked anæmia, and in some cases marked stiffness of the legs and failure of vision.

During December five more of the household died. Some of the servants had run away, but he believed that not less than fifteen of the household of twenty-two were dead by the end of December. Of his relations, his mother, brother and nephew were alive. The actual family members were originally eight in number so that exactly half had died. The mortality was much greater among the servants and their children. They had received medical treatment

from a *kaviraj* physician who had advised them not to eat rice. This advice had been partly carried out by the family members but probably not at all by the servants. The household was broken up and he returned to Calcutta on December 22nd.

Condition on admission, January 8th.—He was extremely anæmic and weak. There was marked breathlessness on the slightest exertion. He was able to walk only a few yards. There was œdema of the legs, the back, the lower part of the abdominal wall and the scrotum. There was slight fever of irregular type. The alimentary system showed little abnormality. His appetite had been consistently good. There had been no diarrhoea. There had been no soreness of the mouth or bleeding from the gums.

Circulatory System.—The heart was dilated and its action rapid—pulse 120. There was a definite mitral systolic murmur and a systolic murmur in the pulmonary area, hæmic in type.

Hæmopoietic System.—The spleen could not be felt and there was no enlargement of glands.

Blood—R.B.Cs. 900,000. Hæmoglobin, 25 per cent. Colour index, 1.39. Marked poikilocytosis, many normoblasts and a few megaloblasts. W.B.Cs. 4,300. Wasserman reaction—negative.

Respiratory System.—Slight œdema of the lungs.

Excretory System.—The urine was normal.

Nervous System.—There was marked spasticity of the legs and arms. The deep reflexes were greatly increased and there was sustained ankle and patellar clonus. The plantar reflexes were flexor and there were no defensive reflexes. There was no sensory loss or hyperæsthesia and no marked wasting. The ophthalmic surgeon reported, "Many massive round hæmorrhages of both retinæ." The symptoms at the time of admission and the blood picture were, therefore, those of a fairly typical pernicious anæmia with spasticity. A simple treatment with sodium arsenate pill and iron was carried out and the patient rapidly improved as indicated by the following blood counts:—

Date.	R. B. Cs.	Hb.	W. B. Cs.	Abnormal cells.
10-1-26	900,000	25%	4,300	Normoblasts, Megalo-
17-1-26	980,000	25%	5,500	Normoblasts, Megalo-
26-1-26	1,380,000	25%	5,500	Normoblasts, Megalo-
31-1-26	1,500,000	30%	6,200	Normoblasts only.
7-2-26	1,850,000	35%	6,500	Do. Do.
14-2-26	2,100,000	40%	6,800	No abnormal cells.
21-2-26	2,500,000	45%	7,000	Do. Do.
28-2-26	2,680,000	45%	7,100	Do. Do.
8-3-26	2,810,000	50%	7,000	Do. Do.

He left hospital on March 3rd greatly improved. There was no œdema and only a slight hæmic murmur. There was no definite spasticity but slightly increased knee-jerks. His vision had improved.

Case 2.—His brother, M. A., *æt.* 30, was admitted to hospital on February 20th. His history was the same and his condition on admission very similar. He also had massive retinal hæmorrhages, spasticity of the limbs with increased deep reflexes and ankle clonus, but flexor plantar responses. He improved under the same treatment as is indicated by the following blood counts:—

Date.	R. B. Cs.	Hb.	W. B. Cs.	Abnormal cells.
20-2-26	1,560,000	30%	5,200	Normoblasts and Megaloblasts.
28-2-26	1,680,000	30%	....	Normoblasts and Megaloblasts.
7-3-26	1,800,000	30%	....	Few Normoblasts only
14-3-26	2,100,000	35%	5,500	Nil
25-3-26	2,500,000	40%	....	Do.
10-4-26	3,070,000	40%	5,000	Do.

He was discharged from hospital on April 15th greatly improved. There was still slight spasticity and defective vision.

Cases 3 and 4.—In March I had an opportunity of examining the other two survivors of the family, but under conditions where full blood examinations were not possible. The mother, *æt.* about 50, had recently become much better. All œdema had disappeared, but her legs were still spastic with markedly increased knee-jerks. She had retinal hæmorrhages in her left eye and an early cataract in the right eye. A blood slide showed anisocytosis but no abnormal cells. The nephew, *æt.* 10, had almost completely recovered. His history was similar, but the only abnormal physical signs were increased knee-jerks.

A consideration of this family tragedy raises many points of interest.

The first is certainly, what was the nature of the primary disease that attacked this household? There seems little doubt that it must have been epidemic dropsy. It occurred in a part of Bengal where this disease is prevalent and at the time of the year when it is more frequent than usual. The symptomatology seems to have been typical at the commencement.

If it is admitted that the disease was epidemic dropsy, and I think that it must be, what was the cause of this epidemic? All agree that this disease is in some way caused by rice. The differences of opinion arise in a consideration of the means by which the rice causes the disease.

Whether the train of symptoms are due to a vitamin defect, or whether they are due to a poison arising from an infection of badly-stored rice are the two theories of causation which at present hold the field. In this case it is difficult to imagine a vitamin defect, as the sole cause.

This well-to-do Bengali family had ample supplies of milk, fish and vegetables. There seems to be definite evidence of at least one supply of bad rice and rapidly following this the symptoms commenced. It seems, therefore, that

in this case the theory that the disease is caused by an infection of the rice, as propounded by Colonel Megaw and Major Acton (1923), is substantiated. The late symptoms that followed this epidemic are quite unique. I can find nothing in the literature of beriberi or epidemic dropsy describing symptoms of pernicious anæmia as sequelæ. The ætiology of the pernicious anæmia syndrome is shrouded in doubt. The intestinal toxæmia theory of Hunter seems to be supported by the best evidence at present, but that theory will not account for many of the cases.

Here we have an acute disease. Some of the victims die in the acute stage. Others recover from the first symptoms but succumb to the later complications. Still others pass through the stage of acute anæmia and recover.

The explanation of this is difficult. The first patient was exposed to the primary infection for a few days only, but it was a considerable time later that the anæmia became marked. He was able to return to the village when his œdema had subsided and it was only later that his anæmia and spasticity became severe.

The same sequence occurred in the other members of the family who survived.

This seems to indicate the continued action of a primary acute infection. If this is so we may here have an indication of the causation of many of the acute anæmias that are so common in Bengal, and that are not explained by such infections as ankylostomiasis. The only clinical symptom of unusual interest in these cases was the marked spasticity common to all of them.

This spasticity is, of course, a well-recognised symptom in many cases of acute anæmia. If it is the main symptom the disease is called the anæmic spinal disease, but in this there are definite areas of degeneration in the spinal cord. There could have been no degeneration in these cases, as the patients recovered.

The only part of the nervous system that can be seen is the retina, and in these cases there were numerous retinal hæmorrhages. It seems logical to conclude that there were numerous small hæmorrhages in other parts of the central nervous system, and particularly in the motor tracts in the spinal cord and brain. This supposition would explain all the symptoms of the incomplete upper motor neurone lesion that were present.

More particularly, the steady recovery of function and the fact that there were never extensor plantar reflexes indicate a condition which did no permanent damage to the nerve tracts, and which was at no time sufficiently massive to block completely the control of the cerebral cortex. This seems to be explainable only by the presence of multiple small hæmorrhages.

Finally, it is probable that such a tragedy as this is not an isolated example. It did not create any unusual excitement in the district or even in the village. It would never have been heard

of if one of the victims had not been a resident of Calcutta and an educated man.

A record of such cases does not seem to advance in any practical manner our knowledge of medicine. It is more a confession of ignorance, but as such has a certain value; for it must make us realise that there is still an immense amount of work to be done. Economic, dietetic, pathological and clinical problems are involved in this record and of each of these problems we know almost nothing.

I must thank Lieutenant-Colonel A. B. Fry, C.I.E., I.M.S., Principal of the Medical College for permitting me to publish these cases.

REFERENCE.

Megaw, J. W. D., and Acton, H. W. 1923. *Indian Medical Gazette*, April and May.

THE BREEDING OF ANOPHELES IN SEA-WATER AND AT A SHORT DISTANCE FROM THE SHORE.

By Capt. B. S. CHALAM,

Medical and Sanitary Officer, Bombay Development Department, Colaba.

It is generally believed that Anopheles do not breed in sea-water. In the course of anti-malarial work instituted by the Government of Bombay in connection with the Back Bay Reclamation Scheme, the contrary was found to be the case. The following anopheline species have been encountered time and again breeding freely in sea-water collections:—

- (1) *A. subpictus* (Donitz).
- (2) *A. stephensi* (Liston).
- (3) *A. culicifacies* (Giles).
- (4) *A. vagus* (Donitz).

With a view to ascertaining the relative strength of sea-water in which anopheline larvæ are able to thrive under natural conditions and also to know the exact species that breed out under these conditions, several samples of sea-water, where anopheline larvæ were found, were analysed, and the species bred out in each case was noted. The analyses were very kindly made by the Chemical Analyser to the Government of

Bombay, and also by the Director of the Haffkine Instituté, Bombay. The results of the analyses and the species bred out from different samples are set out below. It is of interest to note from these results that anopheline larvæ were found under natural conditions in water even with a saline concentration three times that of sea-water.

Water sample as per previous statement. Species of anophelines bred out.

- (1) Sample A .. *A. subpictus* and *A. stephensi*.
- (2) Sample B .. *A. culicifacies*.
- (3) Sample C .. *A. subpictus* and *A. vagus*.
- (4) Sample D .. *A. subpictus*.
- (5) Sample E .. *A. subpictus* and *A. stephensi*.
- (6) Sample F .. *A. subpictus* and *A. stephensi*.
- (7) Sample G .. *A. subpictus* and *A. culicifacies*.
- (8) Sample H .. *A. subpictus*.

It has been stated by some workers that sea-water is the best of larvicides. This is true in one sense and yet it is also true that Anopheles breed out freely in sea-water, the explanation being that anopheline larvæ hatched out in fresh water die very soon when placed in sea-water; but if the anopheline ova are laid to start with in brackish or sea-water, they thrive and hatch out into adults as easily as they do in fresh water.

Where breeding can be expected.

It is obvious that no breeding can take place in the open sea. It is only the foreshore that is the dangerous area, and on the foreshore the tide is the deciding factor. Where the foreshore is washed even by the neap-tide that portion can be safely dismissed as a non-breeding area because this is completely inundated by the tide twice a day and any ova laid here are most likely to be destroyed before they can hatch out into larvæ, whilst the constant agitation and flooding are most unsuitable even for the growth of the larvæ. During the course of three years' observation, I have not encountered any breeding

	Normal sea-water.	Sample A.	Sample B.	Sample C.	Sample D.	Sample E.	Sample F.	Sample G.	Sample H.
Volatile and organic matter. Grains per gallon.	1414.0	175.0	38.5	Total solids 168 grs. per gallon.	45 % of sea-water.	90 % of sea-water.	90 % of sea-water.	25 % of sea-water.	Three times as concentrated as sea-water.
Silica ..	14.0	0.7	1.4						
Iron and aluminium oxides ..	14.0	2.1	1.4						
Lime (CaO) ..	70.0	44.8	14.0						
Magnesia (MgO) ..	116.0	18.6	13.3						
Carbonic anhydride (CO ₂) ..	61.6	10.7	19.1	Chlorine. 91 grs. per gallon.					
Sulphuric anhydride (SO ₃) ..	127.2	31.2	32.1						
Chlorine ..	1106.0	266.0	136.6						
Alkalies (as chlorides of sodium and potassium).	276.1	154.9	72.3						

in this region. But that portion of the foreshore which is washed only by the spring-tide and is untouched by the neap-tide constitutes the real danger zone, inasmuch as this area is cut off from any tidal influence from time to time for a sufficiently long period to allow of the emergence of the imago from the ovum. The presence of low shrubby vegetation like mangrove plants, irregular rocky outcrops, hollows, depressions and ditches in this area are all factors which lead to the formation of suitable breeding places, as a result of (1) filling by the spring-tide and (2) seepage. As the spring-tide after reaching its high water level recedes, the lace work of the rocks is exposed and amidst their dark circles are left pools which remain in unruffled calm sufficiently long for the mosquito to breed out; all the hollows and depressions are filled up by the receding tide and form ideal breeding grounds; the presence of vegetation is another aiding factor as it affords protection to the larvæ, provides a good food supply, prevents danger from fish, and retards the action of larvicides.

As an interesting illustration of the distance which a mosquito can cover to find suitable breeding places, the following is one. In the present reclamation works a massive sea-wall is being built so that the area between the wall and the shore margin can be reclaimed by dredging. On the top of this wall long trenches exist in some places which collect sea-water from the breaking of the waves against the wall. These collections are comparatively stagnant and in some places are quite a mile distant from the shore. During the course of dredging operations, sometimes the intervening portion between the wall and the shore becomes most unsuitable as breeding places, and on such occasions extensive breeding was detected in these trenches a mile away from the shore. Breeding in isolated pools at comparatively long distances from the shore (from $\frac{1}{4}$ to $\frac{1}{2}$ mile) had been noted before, but none so remarkable as this.

Although only four anopheline species as mentioned above have been noted by me breeding in sea-water, some other observers have also detected other anopheline species, e.g., *A. ludlowi* breeding in brackish water. These findings emphasise the fact that sea-water collections require as much looking after as fresh water collections and that considerable distances are covered by mosquitoes in quest of breeding places. Further, to those engaged in work of this nature a study of the tide will be most helpful as it will indicate:—

(1) The possible and most probable places where breeding can be expected.

(2) The places which can safely be disregarded as non-breeding areas, being constantly under tidal influence.

(3) The areas that should be treated with larvicides.

(4) The time when the larvicides should be used; for instance, oiling on a day when likely

breeding places which will be completely washed by the tide next day is absolutely useless.

REFERENCE.

Report on the Back Bay Reclamation Scheme by Lieutenant-Colonel S. R. Christophers, C.I.E., O.B.E., I.M.S.

A STUDY OF CANCER IN INDIA.

By MAJOR K. K. CHATTERJI, F.R.C.S. (Ire.),
Bengal Medical Service.

BEING struck by the large number of admissions of inoperable cancer cases in my wards in Calcutta and district hospitals, I commenced to study this subject a few years ago. The statistical data were meagre and the facilities for study limited, though clinical material was forthcoming. I am indebted to the Indian Research Fund Association for their assistance during the first few months of my investigations. Recently whilst I was on leave in Europe I had the opportunity of discussing my views with many eminent scientists and workers in the field of research in London, Edinburgh and on the Continent. It was gratifying to find that some of these men shared my views on the ætiology of cancer and on the nature of the histological changes leading to the regression and disappearance of neoplasms.

THE INCIDENCE OF CANCER.

In England and Wales with a population of 37,885,242 in 1921; the total mortality from cancer was 46,422, i.e., 1.215 per mille (1). I am not entering into the questions of expectation of life and the birth-rate, but it has been reported that the cancer mortality has increased three-fold in the space of two generations.

The incidence of neoplastic growths in India has been a subject of much speculation; statistics collected from census returns and hospital and post-mortem records do not seem to give reliable data. It is, however, a well-known fact that cases of inoperable cancer are very common and the mortality is apparently as high as it is in England and Wales if not higher. There are, however, certain facts which we may consider, namely:—

(1) Benign tumours are more or less equally distributed all over the world.

(2) Malignant transformation of ulcers and benign tumours is perhaps not as common in the East as it is in colder climates.

(3) The real or apparent frequency of incidence of malignant growths may to a great extent be explained by the involvement of particular tissues or organs, due to local conditions or site incidence.

(4) Generally speaking, the type of malignancy in many cases is not very virulent; and

(5) There is less tendency to the involvement of lymph glands.

In this connection, I may refer to what I have said about tropical granulomata, that granulomatous ulcers do not as often become malignant

as would be expected considering the irritation these are subjected to; on the other hand, cancers of the tongue, lips, mouth, face, penis, and other parts seem to assume a virulent type of malignancy.

Much difficulty is experienced in obtaining satisfactory statistical records in India. The central and provincial governments publish excellent returns, based on figures obtained from hospitals, but the usefulness of these returns is greatly affected by some local conditions; for instance, one or two sections of the Indian community notably the Mohamedans will not have the body of the dead desecrated either by post-mortem examination or by dissection. Then there is the *purdah* system which precludes many female patients from undergoing medical examination. The incidence of benign tumours is in all probability much higher than hospital statistics show, because, owing to their peculiar mentality, Indian patients with these growths do not generally seek advice, at any rate not till these tumours grow to enormous size causing much inconvenience, disability and pain due to weight and mechanical pressure. On the other hand, they would soon visit a hospital for a fast-growing painful malignant growth. This perhaps explains Rogers' statistics compiled from hospital and census returns(2); in one of his important statistical records of 1,190 cases in Calcutta we find the rate per mille of malignant and non-malignant growths to be 579 and 421, respectively; in other words, for every ten benign cases, 15 malignant ones were admitted. If the statistics are taken for what they are worth and compared with European and American statistics, it would seem that the relative incidence of benign tumours shews very different proportions; for instance, while the proportion of benign to malignant breast tumours in a fairly modern Eastern hospital with well-kept records is as 1 to 2, in a similar British hospital it is 1 to 7.

THE AGE INCIDENCE OF NEOPLASMS.

The age incidence of neoplasms has been a subject of much controversy. It has been suggested that neoplasms—particularly those of malignant type—are seen in younger patients in the tropics than the average age at which they occur in the colder countries. I may here quote the high authority of Sir Leonard Rogers(2):—“We may, therefore, conclude that there is no difference in the incidence of this class of tumours (epithelioma) in ‘uncivilised’ Bengal people and in ‘civilised’ Europeans in England, except that when the age factor is allowed for, squamous-celled cancers are much more common in the Bengali race.” Several explanations have been put forward in support of this, such as low expectation of life in India; also climatic and physiological factors which influence the endocrine mechanism and accelerate sexual development and senescence in India and it is concluded that the agencies affecting the growth-inhibiting factor, predisposing to cancer, are likely to be

present at an earlier age in the short-lived, precocious and prematurely-old people of the tropics. Economic distress and nutritional defects of the indigenous population have been referred to as direct or indirect causal agents in this connection. I have not been able to satisfy myself about these explanations. From the examples given later it would appear that there is not a great variation between the so-called “cancer age” in the East and the West, but I would rather not draw conclusions (Plate I, figs. 1 and 2). These subtle and complicated questions involve considerable statistical, clinical, biological and pathological study.

THE SITE INCIDENCE OF CANCER.

The site incidence of tumours in the tropics is equally interesting. There is a great preponderance of gastro-intestinal cancers in the colder climates as compared to those in the tropics; for instance, it is 7.6 per cent. of all cancers in the Calcutta statistics and 33 per cent. in one of the London hospital returns; this is in spite of the fact that gastro-intestinal diseases are commoner in India and other tropical countries, and are often due to protozoal infections. Intestinal ulcers, papillomata and adenomata are not uncommon in endemic districts but they do not seem to undergo malignant changes to any great extent, at any rate not to the extent that cases of rectal and intestinal adenomatosis are found to become cancerous in some of the London hospitals. In this connection it is interesting to refer to the work of Mr. Lockhart-Mummery and Dr. Dukes of St. Mark's Hospital regarding intestinal adenomata, a high percentage of which are found to become malignant. I have some interesting illustrations of these and I have seen a large number of cases and specimens in the operating theatre, in the wards and in the pathological museum of St. Mark's Hospital.

On the other hand, primary carcinoma of the liver is common in many tropical countries. Epithelioma of the penis is also common in certain classes of people in some parts of the tropics, as also is malignant disease of the skin. If, while considering the site incidence of cancer, the liver, penis, skin and perhaps one or two other regions such as the mouth, the jaws and the tongue are excluded, the total number of other types of cancer is relatively small, and on analysing this material in most cases we can find direct or predisposing factors aetiologically related to the local conditions.

Cancer of the liver is very often preceded by cirrhotic changes in that organ which are in most instances induced by parasitic infections. This is interesting in view of recent researches on cancer. The living parasites, their remains after death or their toxins cause chronic irritation of the liver tissue and cell proliferation resulting in cirrhosis and hyperplasia, the precursors of cancer. It is interesting to note that though cirrhosis and other pathological conditions of the

spleen and the liver are often associated, being initiated by intestinal toxins circulating in the spleen as well as the liver, neoplasms of the spleen are very rare. In Europe (England, Belgium, Germany, etc.), the proportion of primary to secondary cancer of the liver is very low, about 1 in 50 to 1 in 25. Cancer originating in the bile ducts and bile passages is more common in colder climates, whilst it is rare in the tropics. In the tropics cancer originates in the liver cells, there being a close ætiological relationship between cirrhosis and primary cancer of the liver. Primary cancer of the liver in Europeans shows a somewhat increased incidence in Hungarian statistics among the Magyars of Mongolian blood (3).

The frequency of penile cancer has been explained in many ways; it has been suggested that it is common among the Hindus and Chinese and rare in Mohamedans and Jews who practise circumcision; this seems to be a weak argument as cancer of this organ is very uncommon among Europeans and others who do not practise circumcision, and quite a number of cancers are seen in the previously circumcised penis of the Mohamedan and the Jew. I am inclined to think that irritation caused by inspissated smegma and dirt confined in the preputial space in cases of phimosis cause irritation and ulceration, and that ulcers of this nature and genital sores in a penis with phimosis or constricted preputial opening are predisposing causes of cancer of that organ.

A fair number of cases of cancer of the cervix uteri are seen. This may be explained by frequent pregnancies and indifferent treatment during the puerperal period. The recently confined mother is often under the care of unskilled midwives (*dhais*) who can hardly interpret the significance of local conditions to the medical practitioner, the gynæcologist or obstetrician who has no access to the *purdahnashin* and cannot satisfy himself as to the real condition. The comparative freedom from malignant tumours of the vagina, the body of the uterus and the breast is interesting, though as I have said benign tumours of these parts are common. The relative proportion of cancer of the cervix to cancer of the body of the uterus in India seems to bear a correspondence to British and American statistics. In Japan the total cancer incidence is high, but breast cancers are few; prolonged lactation and late involution may explain the infrequency of breast cancer in India and Japan. In most tropical countries the indigenous woman takes a pride in being the mother of a large family, and whilst she scores by escaping cancer of the breast she loses by developing cancer of the cervix.

It has been the experience of some that malignant disease of the skin is common in the tropics. It is often associated with some form or other of parasitic infection and subsequent irritation. Very often there is a pre-existing hyperkeratosis with proliferation of cells and hyperplasia and

the whole process is of a chronic character. Pigmentation plays a part, as epitheliomatous changes are often preceded by depigmentation, particularly of an area which has undergone hyperkeratosis; a hyperpigmented papilloma sometimes becomes malignant. Different types of irritation are associated with epitheliomatous changes in the skin. Burns, such as the *kangri burn* of Kashmir, irritating applications to the ulcers left after burns, and chemical and other irritants used for the cure of parasitic diseases of the skin and for wounds and ulcers are some of these examples.

Malignant diseases of the buccal mucosa, the face and the jaws are not only common but are often of virulent types, destructive and less amenable to treatment (Plate I, figs. 3 and 4). Betel chewing is a prolific cause and the prevalence of cancer in different classes of the population addicted to this habit varies according to the nature and composition of the ingredients used and to the extent to which betel is chewed. If the "quid" consists of betel leaves and nuts, some catechu and a small quantity of lime, it causes less irritation, but in some parts of India other substances such as tobacco leaves are added. This practice is more common in Travancore, Madras, Ceylon and Saigon, and rarer in Tonkin, the Dutch Indies and Upper India. The Singalese use a strong "quid" containing burnt gall and they smoke short strong cigars manufactured locally. In Orissa and to some extent in Bengal the "quid" consists of the usual betel (*pan*) and dry tobacco; these are chewed and tucked away in the folds of the mucous membrane between the cheek and gum. The irritation at first causes leucoplakia and is followed by epithelioma. A pre-existing syphilitic leucoplakia accelerates the process. Neoplasms of the jaw often commence in the gum and alveolus and extend deeply to the bone. In some cases with or without a history of irritation, non-malignant tumours of the jaw and alveolus develop, run a chronic course and attain enormous sizes without becoming malignant. I have successfully excised many of these tumours (mixed fibromata, epulis, etc.), which had been existing for years. In one case the growth was in a young man, and in another in a woman past adult age. The size and extent of growth can be judged by the illustrations (Plate I, figs. 5 and 6). These patients were kept under observation for a long time and no signs of recurrence were seen. I have also seen benign growth in the mouth, lip and tongue in betel chewers.

Occasionally malignant changes take place in Hodgkin's disease; of course the true nature of these lympho-granulomatous glands is not as yet clear. I have seen instances in which such cases had become definitely malignant.

Malignant disease engrafted on to elephantoid tissue is occasionally seen; these are often caused by the application of irritants reputed to cure the condition. Metastases in these cases are



Fig. 1.—A fibro-lipoma in the right scapular region of 8 years' duration, in a patient aged 65 years; it had ulcerated but had not become malignant.



Fig. 2.—Fibroma growing from the pericranium of the frontal bone: age 40 years. Duration 8 years.

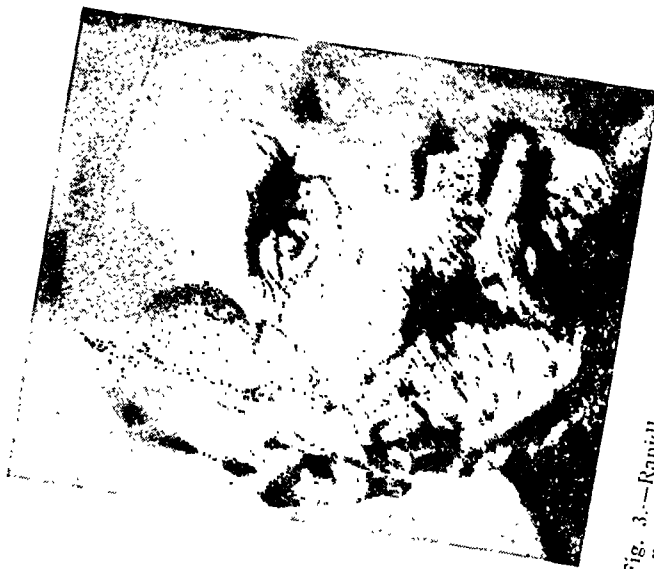


Fig. 3.—Rapidly spreading epithelioma of the mouth and cheek in an old man addicted to chewing *pan*.

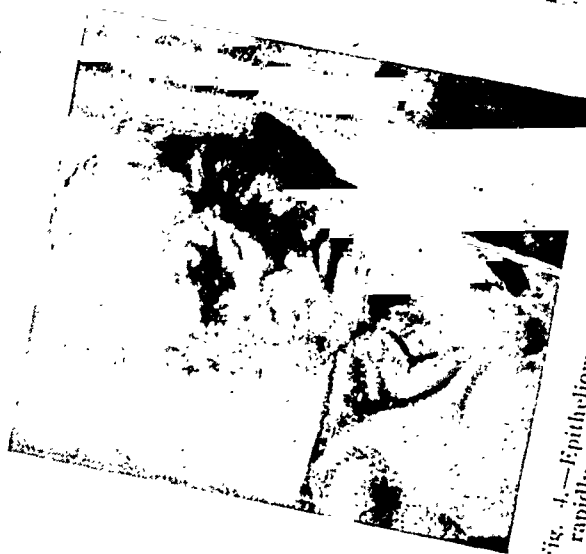


Fig. 4.—Epithelioma of the lip, spread rapidly upwards, destroyed the soft structures the orbit and the eye.



Fig. 5.—Filomatous growth from the alveolus and upper jaw in a betel-chewer. It had been growing for several years.

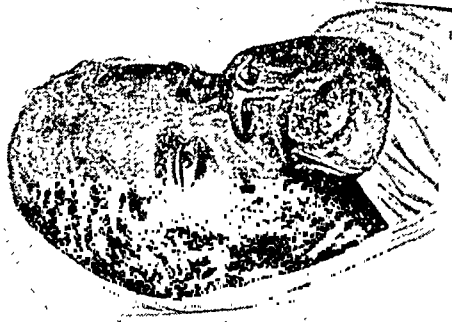


Fig. 6.—Fibroma of the upper jaw in a woman of 45, growing for 4 years. She was a betel-chewer.



Fig. 7.—Papillomata appeared on elephantiasis scrotum. These became epitheliomatous. Inguinal and iliac glands were enlarged. Glands were enucleated, then the scrotum with the growth. Pathological examination of glands—hyperplasia, no malignancy; scrotal growth squamous epithelioma.

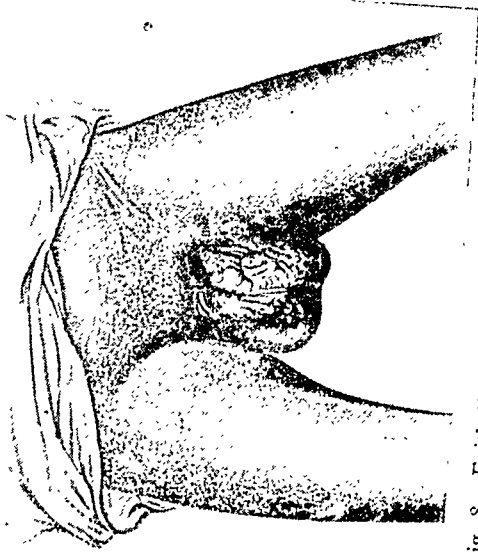


Fig. 8.—Epithelioma engrafted on preputial elephantiasis. Local excision: cured.



Fig. 9.—Extensive epidermoid carcinoma of the leg (before occurrence of malaria).

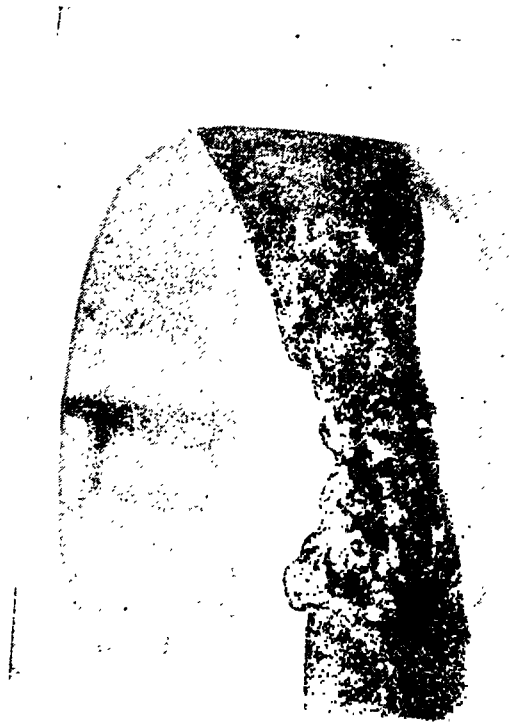


Fig. 10.—Same case as in Fig. 9 showing the changes noticed after 14 days of fever due to malaria of benign tertian type.

often absent, possibly owing to the lymphatic obstruction. I have treated several cases by local excision of the mass and at the same time excised the superficial and deep inguinal chains of glands as a prophylactic measure. There were no recurrences or late metastases. Cases of epithelioma engrafted on to elephantoid scrotum, prepuce and penis were treated successfully by this method (Plate II, figs. 7 and 8).

Tumours and cysts connected with the skull, the brain and its membranes are rare and often present difficulties in diagnosis. Occasionally benign tumours of these parts of long duration become malignant in fairly advanced age.

SOME ÆTIOLOGICAL CONSIDERATIONS.

We may next consider some peculiarities of cancer incidence in India, and in this connection we have to observe two facts, namely, the advent of cancer, i.e., the malignant transformation of the cell, and the rate of growth of cancer, i.e., the rate at which the malignantly transformed cells multiply. While studying and investigating these I have been confronted with conflicting facts and conclusions. The climatic and dietetic conditions, the influence of heat and light, influences due to peculiarities in habits and customs of the indigenous population and their effect on metabolism through the endocrine system reflect on the animal physiology generally. The average diet of Indians consisting mainly of fat and of carbohydrates chiefly, with grains and cereals with a high calcium content, leads us to the conclusion that the calcium content of the blood should be high in Indians, the effect of light and heat on the parathyroid gland perhaps influencing the calcium metabolism. Experiments *in vitro* and *in vivo* seem to indicate that calcium has an inhibitory effect on the growth of cancer. [Bube(4), Price-Jones(5), Mottram(6), Clowes and Frisbe(7).]

The calcium content in the sera of normal Europeans is between 9 and 11 mgm. per 100 c.c. of serum [Vines(8), Haaland and Cramer(9), and Howell(10)]. The calcium content of Indians estimated in the sera of a number of normal individuals in Major Acton's laboratory at the Calcutta School of Tropical Medicine lies between 10 and 10.5 mgm. per 100 c.c. of serum. In my earlier investigations I found that the sera of many cancerous patients were deficient in calcium(11). This has been further corroborated by the estimations made in Major Acton's laboratory of two of my cancerous patients, the content being 8.13 and 8.44 mgm. per 100 c.c. of serum, respectively. Further tests are in progress.

There are experimental and other evidences of an increase of potassium salts in the blood and tissues of patients with cancer. [Colwell(12)]. In this connection we may refer to Bogart and Plass' conclusions(13); rapid growth implies an increased demand for calcium salts, for instance, there is a demand for calcium owing to rapid

cellular multiplication in pregnancy, there is a deficiency of calcium in the maternal blood to meet the demand by the rapidly-growing cells of the foetus [Vines(8), and also Jansen's conclusions(14)]. Potassium salts are antagonistic to calcium. There is a disturbance of the calcium metabolism and a progressive decrease in calcium content of the blood from adult to middle age, calcium getting bound in the tissues and free calcium not being available; this deficiency is accentuated when cancer develops. This is supported by conclusions arrived at by the Sherrington Committee of the British Association for the Advancement of Science, (pp. 45—65).

With reference to a diet rich in fats and oils, the fat-soluble vitamine A in it would help calcium metabolism. Katabolism of fat and carbohydrates go together according to Leathes(15) and Raper(16). McCarrison has shown experimentally that withdrawal of vitamine B from the diet in a monkey caused its death, and on post-mortem examination he found cancer in its stomach. There are evidences of disturbance of the fat-metabolism in cancer. Normal physiological liver fat has an iodine value of 130, with an increase of liver fat its iodine value is reduced to 60 to 65; the iodine value of the fat of adipose tissue is 60 to 65. It has been found that the iodine value of the liver fat in a case of cancer of the bladder was reduced to about 80. The more fat there is in the liver, the nearer it approaches the normal fat. In cancer more fat is found in the liver in post-mortem examinations and its iodine value approaches that of normal fat. The liver has a power of desaturating fat, according to McLeod(17). It is also interesting to note that the iodine value of fat increases with age, perhaps as a defensive mechanism; for instance the iodine value of the liver fat in a child 11 years old is 44.5 and at 19 years 60, later 62.1. The iodine value of cancer fat, which is more or less constantly higher than normal, is about 72.6. The accumulation of unsaturated fatty acids in the neighbourhood of cancer may be a defensive mechanism, and the lymphocytes may play an important part in retarding the spread of cancerous growths. These views are supported by Nakahara(18). Deficient lipoclasia may play a part in cancer metabolism [Currie(19)]. There is an increase of unsaturated fatty acids which is more marked near the growth, there being a qualitative and quantitative difference in the fats of cancerous patients as compared with normal [Shaw McKenzie(20)].

With further reference to a diet which is deficient in proteins, I may refer to the experimental conclusions arrived at by Sugiura and Benedict(21), in which they say that ingestion of a protein-free diet causes much diminution of tumour growth, accompanied by extreme malnutrition of the host.

It has struck me that the growth-inhibiting factor has some remote influence. Years ago, I

made a very provisional statement that neuro-syphilis was rare among Indians, not knowing then that malaria had any influence on late syphilis; subsequently I mentioned it in my book on "Syphilis, with Special Reference to the Tropics," pointing out the disproportion between the cutaneous, skeletal and visceral lesions of syphilis and neuro-syphilis in Bengal when compared with similar lesions in Europe. Perhaps conclusions on similar lines with reference to cancer may be disclosed in future.

I may here refer to certain experiments by Cramer on the influence of hyperthermia on cancer which particularly interested me. Briefly stated, a prolonged elevation of the body temperature has an inhibitory effect on the growth and development of experimentally produced cancer in mice. What effect would tropical heat have on the genesis of cancer? In this connection it may also be asked if prolonged tropical fevers would have any influence on the genesis of cancer. I have recently had an interesting case of a patient with extensive epidermoid carcinoma of the leg, where malarial fever of benign tertian type occurred. The effect on the growth was rather interesting. The discharge was considerably reduced, it was less foul and the actively-growing fungating mass seemed to disintegrate; a line of demarcation was seen at the margin of the growth (Plate II, figs. 9 and 10). In these cases it would be interesting to investigate if the effect is directly due to prolonged elevation of body temperature or through the thyroid-adrenal apparatus.

PARASITES AND CANCER.

The rôle played by parasites in the genesis of cancer is a subject for close study and investigation in India. Recent researches seem to indicate that the presence of parasites or even their dead remains often stimulate cell proliferation and sometimes to such an extent that the cells may undergo degenerative and regressive changes leading to malignancy. As a matter of fact, a close sequence of these processes is being established; neoplasms have been produced experimentally in animals by *Cysticercus fasciolaris* (22). Bilharzia infection of the genito-urinary tract is a common cause of cancer; chronic amoebiasis is one of the predisposing causes of hepatic cirrhosis and cirrhosis is often a precursor of cancer. Are these changes induced by the irritation caused by the parasites themselves, or do some virus-like products of living or dead parasites or both influence the cells in such a way that they become precursors of cancer?

THE REGRESSIVE CELL.

This brings us to a consideration of the cancerous transformation, i.e., degeneration or regression of cells. The cell as a progenitor of cancer and the influences which give it a capacity for perpetual, meaningless and purposeless multiplication, generation after generation—the so-called virus and specific factor [Gye, Lumsden

and others (23)], growth-producing factor and growth-inhibiting factor [Carrel, Mottram, Drew and others (24)], are subjects which have to be studied in relation to tropical conditions. The delicate chemical structure of cells, and the intracellular and pericellular disposition of the protein and fatty elements are still obscure. How little do we know then of the biochemical nature of the cells which are becoming cancerous, or of the effect produced by the various methods of treatment on the cells themselves or the pericellular elements. There are differences in these conditions in the tropics. Cell proliferation, hyperplasia and lymphatic permeation in cancer require close study, both by histological and experimental methods. This is emphasised by the fact that peculiar types of cell proliferation in pathological conditions of the lymphatic system are common in India and the tropics. It has been pointed out [Rogers, (2)] that metastasis in the lymphatic glands in cancer is not so common in India as in Europe. I have recently had two cases of extensive epidermoid carcinoma in which the lymphatic glands were still not involved.

THE RATIONALE OF TREATMENT.

It is not the scope of this paper to enter into a discussion on the treatment of cancer at any length. It will, however, be briefly considered in view of what has been said.

The present-day treatment of cancer, such as it is, is a vast subject and in India it presents still further problems. For example, in diagnosing a case of neoplasm we have to differentiate it from: growths of parasitic origin; the differential diagnosis of granulomata, of splenic and hepatic enlargements, of filarial diseases and of chronic amoebic infection involving the intestines and the retro-peritoneal glands is often difficult. I have had several cases in which tumours of the iliac fossæ closely simulated neoplastic growths but which on closer examination were found in some cases to be amoebic pericolicitis with adhesions and lymphadenitis, while in other cases they were filarial lymphadenitis. I have already discussed the rôle played by parasites in the genesis of cancer, and while trying to eliminate enlargements and growths of parasitic origin one may easily lose sight of the fact that neoplastic changes may have taken place in them.

We are also faced by other difficulties, such as the anæmias and cachexias which are so common in India. There is also a peculiar condition of hæmoglobinæmia; if a patient with an abdominal mass shows signs of anæmia, cachexia or hæmoglobinæmia we may easily be led to think the case to be one of intra-abdominal neoplastic growth.

In cases which promise good operative results, but little need be said; by wide excision and dealing with the metastatic glands satisfactory

results should be obtained, but I would like to urge the importance of post-operative radiotherapy in these cases. I cannot overestimate the importance of this in view of the number of recurrences that we see after clinical cures by operation.

This brings us to the question of treatment of inoperable tumours, i.e., those in which the operative hazard is unwarrantably great, or in which reasonable hopes of permanent cure cannot be entertained after surgical extirpation. In these cases our aim should be to adopt such pre-operative measures as would so modify the local condition as to give a comparatively better post-operative prognosis. We can then undertake to operate and adopt post-operative measures with better hopes of successful results.

I shall briefly detail the plan which I adopt in general for the treatment of malignant growths, operable and inoperable. Perhaps it would have been wiser to withhold results until more definite conclusions are arrived at, but in my attempts to explore the vast and difficult subject of the treatment of cancer, I feel that I have found some definite indications for progress in different directions. This is my excuse for describing shortly a line of treatment which has brought me successes, sometimes beyond my expectations.

In order to eliminate protozoal and parasitic infections the blood is examined to ascertain the total and differential leucocyte count, the hæmoglobin value and the calcium content of the serum; the Wassermann reaction is also tested.

The protein value of the patient's diet is reduced as much as possible and calcium and parathyroid gland administered.

In my previous communications and publications I have stated my reasons for using fatty acids and copper in granulomatous ulcers: I shall now briefly summarise my views.

The introduction of unsaturated fatty acids is indicated in order to correct the disturbance of fat metabolism in cancerous patients and to help the calcium metabolism. I have already explained that margosic acid with its peculiar chemical formula $C_{22}H_{40}O_2$ and its high iodine value has cleansing and healing properties for ulcers.

Copper, used in therapeutic and non-irritative doses, induces changes in the tumour tissues which seem to supplement the changes produced by radiation. It induces fibrosis and encourages epithelization. It has been noticed that copper introduced into the system is attracted to the tissues in which rapid cell division is in progress. Copper has certain anti-protozoal and anti-bacterial properties as well.

In some cases treatment with ethyl ester margosate with copper has cleared up growths and removed all evidences of malignancy.

In other cases this treatment was combined with x-radiation which is an important therapeutic

agent with a specific effect on cancer. The effects produced by radiation cannot be simulated by those with any other agent, though other accessory therapeutic measures seem to supplement and intensify these effects. The therapeutic effects of radiation may be due to the direct action of the rays on the cancer cells themselves, or upon the immediate neighbourhood of the growth or both. The direct action on the cancer cells may be to destroy them or to inhibit their power of regressive multiplication. On the peripheral tissues, whether invaded or normal, the cells of which are said to be less radio-sensitive, the rays seem to produce a stimulative reaction; there is proliferation of the capillaries, migration of leucocytes, infiltration by lymphocytes and plasma cells and the advent of fibroblasts and other changes. This proliferation of normal cells and tissues invades the neoplastic tissue. These either replace the cancer cells or grow in and around the cancer cells so effectively that they jeopardise their existence. It would thus appear that in the cure of cancer by radiation, in addition to the actual "killing" of the cells, the stimulating reaction of the normal cell elements is of much significance. This general view of the beneficent effect of radiation is gaining ground.

The systemic action of radiation is still more complicated; it involves the principle of "non-specific immunisation." This has been proved to apply in experimental early cancers treated by radiation.

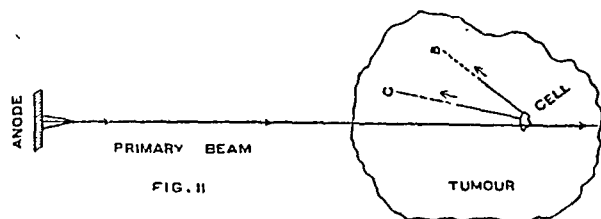
The histological changes observed in the surrounding tissues may be an indirect result of the changes induced by the rays in the neoplastic cells and tissues of the tumour; it may also, however, at least be partly due to the action of the scattered or secondary rays. Some parts of a beam of x-rays falling upon a tissue are absorbed, whereas other parts are either scattered or become secondary rays; these secondary or scattered rays are of longer wave-lengths. If in the malignant tissue there is a substance which is not penetrated by the x-rays to the same extent as is the tissue itself, secondary homogeneous rays, softer than those in the primary beam, are produced. If therapeutic particles of copper are distributed in the tissues of the growth in different dispositions, the characteristic secondary homogeneous rays from them which are softer, i.e., of longer wave-length, are emitted in all directions into the tissues. These facts gave me the idea of trying the therapeutic effects of x-rays on tumours after the introduction of copper.

My reason for using the ethyl ester margosate of copper rather than that of heavier metals in cases of malignant neoplasm by intravenous or intramuscular injection, and also by local injection into the growth, is that metals of higher atomic value than copper require hard primary rays in order to induce secondary rays, and these being harder than those produced by copper

would probably not be retained or absorbed in the neoplastic tissues. Hence such metals were not used.

The clinical results and the conclusions arrived at are shown graphically in Figs. 11, 12 and 13.

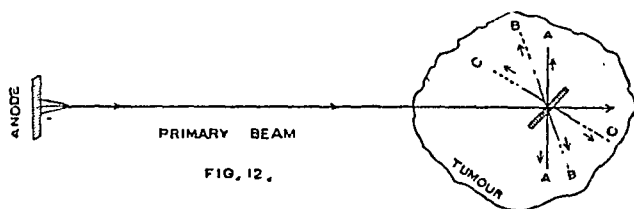
Fig. 11. Direct radiation, i.e., those rays produced by the primary beam excite from the



cells scattered rays (B) and secondary cathode-rays (C), both being of the same type as the primary beam. The characteristic properties of these rays is to cause destruction of the cell, the nature of the changes produced in the cell depending on the technique and dosage of the radiation, the nature and virulence of the malignancy, and the age of the tumour.

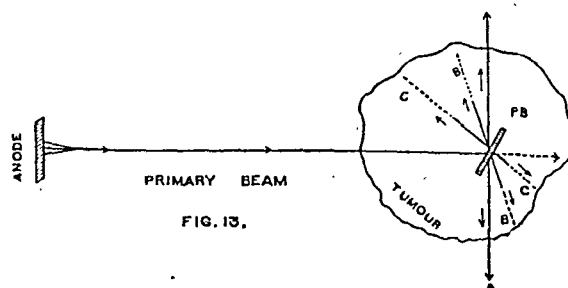
Every cell has a life history and passes through different stages of a life cycle; so also does a malignant cell: the effect of the rays is calculated by their action on the cell and by the changes produced in its structure at the particular phase of its life cycle. Generally speaking, the changes noticed are vacuolation, hyperchromatosis, pyknotic changes, keratinisation, etc. In this case the effect of the characteristic primary rays, if any, is negligible; if however, any effects corresponding to those of the secondary rays are produced, these would be due to an indirect action, i.e., the effect produced by the products of disintegration of cancer cells on other cells of the tissue.

Fig. 12. If there is a metallic element, e.g., copper (Cu) in the tissues of the growth, the



primary beam on striking it excites characteristic secondary rays (A), scattered rays (B), and secondary cathode-rays (C). Most of these secondary rays, being softer than the rays of the primary beam, are retained in the tissue of the tumour. It has been suggested that these secondary rays are responsible for the histological changes and the clinical effects. The scattered rays (B) and the secondary cathode-rays (C) are of little or no use in this case. Only the (A) rays are of use.

Fig. 13. In this case the element is lead (Pb.) which has a much higher atomic value than



copper, and as such the secondary homogeneous rays emitted by lead which is harder than those of copper, pass right through the tumour and cannot be utilised by it.

I adopt the following technique:—(1) Weekly injections of ethyl ester copper margosate, either intravenously or intramuscularly, the maximum dose being 0.5 c.c. Treatment can, however, be commenced with smaller doses and regulated according to the general condition of the patient. (2) Parenchymatous injections into the tissue. Take a rather blunt long needle and a syringe, preferably an all-glass one graduated in cubic centimeters, insert the needle into the periphery of the growth and push it deeply into the tissues, injecting one or two minims at a time and gradually withdrawing the needle till 0.5 c.c. is injected. This quantity is injected by several punctures along one-half of the circumference of the growth at one sitting, the process being repeated on the other half of the growth after an interval of a week or less. (3) The tumour is irradiated 24 to 48 hours after these parenchymatous injections.

It is not my intention in this paper to discuss the genesis and nature of cancer. There is overwhelming evidence that cancer in its subtle and aggressive destructiveness claims a large number of unwary and ignorant victims in India. Many are the unexplored tracts in the field of cancer research in India regarding the peculiarities in the origin and life cycle of the neoplastic cells and their pre-cancerous and post-cancerous histological changes, which are more or less peculiar to the tropics. These facts show how imperative it is to study the problem of cancer in India from experimental, clinical and therapeutic points of view; the devotion and enthusiasm of workers in the field of cancer research in the West and their enquiries as to how tropical conditions influence the causation, development or regression of cancer stimulate us further to this study. It is wise not to dogmatise until definite conclusions have been arrived at; that is why I do not at present discuss the results which I have obtained from my work on experimental cancerogenesis.

SUMMARY.

Difficulties in obtaining reliable data on the incidence of cancer in India are discussed. It is

suggested that organised and systematic methods be adopted to add to the value of the well-kept returns in the provincial and Indian headquarters of the medical departments. The low general expectation of life and the mortality from endemic diseases should be taken into account with regard to age groupings in collecting statistics. The age and site incidences of cancer in India shew many interesting features, and it is suggested that facts and figures with reference to these should be collected.

A close study of the ætiology of cancer in relation to variations in climate, diet and mode of living in India and the influences of these factors on physiological functions, through the endocrine mechanism or otherwise, is considered. The relationship of tropical granulomata and of different types of chronic irritation peculiar to the tropics to the genesis of cancer is discussed. Reference is also made to malaria and tropical pyrexias in this connection. The peculiar histological characters and the behaviour of the regressive neoplastic cells under the influences described above are not only interesting, but may be expected to lead to conclusions relating to the solution of the cancer problem. Experimental cancerogenesis in relation to climatic and other conditions is an essential feature of these investigations.

Apart from the actual incidence of cancer, it appears that cases of so-called "inoperable cancer" are not only more frequently seen in India than in many other countries, but the mortality from them is very high. A line of treatment for this condition is described.

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TREATMENT BY PROLONGED SLEEP IN PSYCHIATRY.

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THE treatment of certain types of mental disorder by artificial sleep maintained over a considerable period—8 to 10 days—was first introduced by Klaesi of Zurich in 1920. Since then this form of treatment has been widely adopted in Europe—except, perhaps, in England—and many observers have published their results. The drug that has been used most extensively for this purpose has been Somnifene. This preparation was first manufactured by Messrs. Hoffmann, La Roche & Co., of Basle. It is a mixture of the diethylamine salt of diethyl-barbituric acid and allyl-isopropyl-barbituric acid.

Klaesi has reported especially well on the results obtained by prolonged narcosis in certain types of schizophrenia. A recent review of the whole subject of treatment by Somnifene by another Swiss psychiatrist, Dr. M. Mueller, tends to establish the conclusion that the most suitable types of mental disorder for this treatment are as follows:—

- (1) Agitated and excited states, especially those in which there is marked anxiety.
- (2) Acute hallucinatory conditions.
- (3) Schizophrenics shewing marked negativism.
- (4) Patients with volitional or ideational stereotypies.

While Mueller is by no means carried away, as perhaps some other observers have been, by the success that has followed this form of treatment in selected individuals, he reaches a positive opinion that prolonged narcosis has proved to be a therapeutic measure that no psychiatrist can afford to neglect. Whether the drug employed for this purpose should be exclusively Somnifene, is, Mueller considers, another question, for the mortality up to the present has reached 5 per cent.

Following the technique suggested by Dr. Jacques Wyler, three patients in the Ranchi European Mental Hospital have been treated in this way. The therapeutic effect produced was not, on the whole, particularly gratifying, except in one case in which a remarkable confirmation was obtained of the suspicions that had been formed as to the main ætiological factor of the patient's disorder. This patient, an Anglo-Indian male, aged 35, was admitted as a voluntary boarder for obsessional neurosis. Owing to the fact that this patient is nearly completely deaf it was very difficult to take a proper anamnesis of his case. However, after prolonged observation the supposition was formed that he was suffering from the effects produced by the death of a sister for whom he had developed a strongly incestuous attachment. It was not until this patient had been rendered stuporous with Somnifene that the full extent of his relations with his sister became known to us. Under the influence of Somnifene he disclosed practically the whole story, and related how he and his sister had lived together as husband and wife. The other two patients chosen for treatment by prolonged narcosis were an Anglo-Indian male, aged 35, suffering from sub-acute mania associated with (?) G. P. I., and an Englishwoman, aged 34, suffering from acute agitated melancholia with anxiety symptoms of extreme intensity.

Copious notes were made on the physical and mental condition of all three patients throughout the whole period of narcosis, and for the abundance and accuracy of these observations I have to thank two of my assistants, Drs. Rama Rao and G. Jagannadhas, as well as the nurses who were in charge.

The details of the treatment are as follows:—

The patient is injected first with 1½ gr. of morphine and 1½ gr. of hyoscine hydrobromide. In about half an hour the patient is asleep and is then injected with 4 c.c. of Somnifene solution intramuscularly, or 2 c.c. intramuscularly and 2 c.c. intravenously. It is important to remember that injections of Somnifene should never be given subcutaneously. The patient should now be in a deep sleep. The nurse is instructed to summon the doctor as soon as she observes any sign of the patient awakening. On the first signs of the return of consciousness, the patient's bladder and bowels are emptied and the patient is fed. If the feeding

of the patient brings about a complete restoration of consciousness another injection of 1 c.c. of Somnifene should be given. Otherwise the patient is allowed to drop off to sleep again. After six or ten hours the patient will awake. Another injection of 2 c.c. is now given and sleep should follow, up to 8 or even 10 hours' duration. After this spell of sleep, which will bring the patient into the second day of the treatment, one injection of 2 c.c. is given every morning and one of 1 c.c. every evening for the rest of the period of treatment. Attention must be paid to the state of the bowels and bladder between each injection. The bowels should be kept open by enemata, and catheterisation must be employed if the bladder will not empty itself otherwise. Liquid food only should be given.

The following precautions should be observed:—

(1) The patient should be treated on a low bed. In the treatment carried out in the Ranchi European Mental Hospital, each patient was treated on one of the specially low beds used for epileptics.

(2) Complete rest in bed is essential.

(3) If the patient gets out of bed, the nurse must remain close at hand.

(4) The urine passed daily should be measured.

(5) The patient should be protected from chill.

(6) Large quantities of tea should be given to promote diuresis.

(7) Each injection should be given very slowly, otherwise there is danger of thrombosis.

(8) If the temperature of the patient rises above 101.3°F. the treatment must be stopped. There is no danger in a rise of temperature up to 100.3°F. With a rising temperature both pulse and respiration will decrease in rate.

(9) The injections should be given first into one arm then into the other arm. If the patient complains of pain, rest may be given to the arms and the injections given alternately into each leg.

Blood counts shew sometimes a leucocytosis and sometimes a leucopenia. The leucocyte count may rise to 12,000 or fall to 3,000.

At the end of the treatment there may be some mental confusion, with or without stammering and salivation. This condition may last several hours.

Only one of the three patients treated in this way shewed any untoward symptom, and his temperature rose on the third day to 104°F. He had also signs of collapse. The injections of Somnifene were stopped and measures taken to combat the collapse. During the ensuing day the temperature fell and the patient recovered sufficiently to permit of the treatment being continued.

The duration of the treatment and the number of hours slept by each patient were as follows:—

Case No.	Duration of Treatment.	Duration of Sleep.
1	10 days	160 hours.
2	11 days	177 hours, 55 minutes.
3	7 days, 20 hours	130 hours, 20 minutes.

Although prolongation of this form of treatment for more than ten days is probably attended with some risk, there is no reason against employing this treatment for shorter periods. For instance, in cases of *status epilepticus*, for which this treatment has been recommended, it might suffice to keep the patient narcotised for one or two days only.

In conclusion, I hope that medical officers in other parts of India who may happen to light on this report, may be persuaded to give this treatment a trial. There is much yet to be learnt from it and about it.

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BOMBAY MILLPONDS AND ANOPHELINE CONTROL.

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and

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In the March 1926 number of the *Indian Medical Gazette*, Captain B. S. Chalam and one of us submitted under the above heading a preliminary communication on the use of Paris green in a millpond in Bombay; it was found that a 1 in 25 mixture of Paris green and cork-powder spread over a part of the pond in which large numbers of *Anopheles* larvæ were breeding, was effective in destroying all the larvæ, the untreated part of the tank having been automatically treated owing to the drifting action of the wind, as the drug-impregnated cork-powder was seen to have floated over the whole surface area at different times during the first twenty-four hours. The subject was pursued further with the object of arriving at some effective, convenient and cheap method of dealing with the millpond problem.

As stated in the last paper, since the introduction of electric drive in the Bombay mills, these large collections of water are no longer in use and do not get heated up as they used to when the mills were working with steam power. As the cost of filling up the tanks is considered prohibitive, and as provision has to be made for a ready supply of water for fire purposes, these tanks or ponds or mill-lodges are at present "necessary evils," and add greatly to the enormous numbers of breeding places that already exist in the island or form during the monsoon and malaria season.

A series of experiments was undertaken in different "lodges" during the present dry season; and the larvæ most commonly encountered were those of *Anopheles subpictus*, with an occasional admixture of a few *Culex* larvæ.

On the first occasion on which we used the Paris green in tank "R" as stated in the previous paper, all the larvæ disappeared in two days, and none were again found for over two weeks. This was looked upon as a very good result. On the second trial, the Paris green was diluted with 80 times its weight of cork-powder and almost the whole surface area of the tank was covered over. The cost of materials used amounted to Rs. 84. Larvæ disappeared as quickly as after the first experiment, but this time they reappeared within ten days of treatment: the action of the 1 in 25 dilution was found to last longer, probably owing to some of the drug being still available when fresh larvæ began to hatch out.

The regular use of the drug in the more effective strength was considered too expensive, and further, a certain amount of risk to persons handling it is said to be attached to the process.

Our attention was, therefore, next directed to "oiling" methods. In the middle of January of this year, tank "M," which has a surface area of 9,000 sq. feet, was found to be breeding a few *Culex* and *Anopheles* larvæ. As a trial only, one gallon of kerosene oil was first poured along one side of the tank. The larvæ did not seem to have been affected at all; three days later, four gallons of kerosene were poured along two sides of the tank. The oil was seen to evaporate rapidly, none of it could be seen the next day, and yet the larvæ had appreciably diminished in numbers. On the 25th January, when they had again increased, four gallons of a mixture of two parts kerosene and one part crude (residual) oil as used in oil-fired boilers were poured along three sides of the tank. Two days later, no larvæ could be found, and the oil was just visible as small dark patches. From the 1st to the 10th February, a few *Culex* larvæ made their appearance in the tank, but thereafter none could be found till the first week of March, though no further measures were adopted. We have seen this spontaneous disappearance of larvæ without any assignable cause on more than one occasion, and the necessity for suitable

controls should be borne in mind when any experiments to determine the efficacy of a new larvicide are in progress.

By the 2nd February, tank "R" (superficial area about 40,000 sq. feet) was found to be again breeding *Anopheles* profusely, and on that day eight gallons of a mixture of equal parts of crude oil and kerosene, cost Rs. 4, were squirted by means of tin cans along all the four sides of the tank. Within two days all the larvæ disappeared, after a week no trace of oil was visible, and the tank remained free from larvæ for twenty days, when at first a few *Culex* and later, on the 24th February, a few early *Anopheles* began to appear. It will be seen that this method is easy to apply, is much cheaper, and perhaps more lasting in its effects than Paris green.

At this time, a consignment of "Larvicidal Blocks" made by a firm in England was received through their local agents for trial purposes. These were tried in both tanks "R" and "M," but their larvicidal effect was found to be negligible.

In a synopsis of the work of the Malaria Research Unit in Palestine, the addition of 0.1 per cent. castor oil to the crude-oil-kerosene mixture has been recommended as leading to better spreading of the larvicide. Accordingly this combination was next tried. On the 27th March, when *Anopheles* and *Culex* larvæ were plentiful in tank "M," it was treated with four gallons of equal parts of crude oil and kerosene plus six drachms of castor-oil, a man pouring the mixture in a thin stream as he walked along three sides of the tank. On examining the tank the next day, only *Culex* larvæ were found, the more delicate *Anopheles* larvæ having been destroyed by the comparatively small quantity of oil used. The oil was visible on the surface for two days.

Tank "M" was kept under constant observation, and by the 5th April, all larvæ were found to have automatically disappeared. On the 9th a few *Anopheles* again appeared, and were increasing rapidly when, on the 15th, steaming water was admitted into the tank for an hour owing to the mill engine having been started after some months' rest. Larvæ continued to increase and four days later hot water had to be again admitted for two hours. The number of larvæ was not at all affected by this treatment. On the 23rd April, when larvæ were in abundance and a few pupæ had also appeared, it was decided to treat the tank with oil. The mixture used on this occasion consisted of three gallons of crude oil, two gallons of kerosene oil and two ounces of castor-oil, costing in all about Rs. 2-8. As a steady breeze was blowing at the time, the whole quantity was poured along the windward side. Within half an hour all the oil had been banked up in the opposite south-west corner of the tank, covering an area of approximately 500 sq. feet, i.e., about 100 sq. feet of surface

was covered by each gallon of the oil. Two hours later, a spot was examined over which oil had been seen to be drifting during the previous hour, and active larvæ were found. During the next twenty-four hours, the wind had shifted the oil scum from one place to another over the whole area of the tank, and no larvæ whatever could be found after a thorough search. The tank remained free from larvæ till the 10th May, when the mill, which is a steam-driven mill, was re-started after some months, and at present the whole body of water in the tank daily heats up to 102°F. to 112°F. so that mosquitoes are not likely to breed in this tank.

The last experiment has proved the efficacy of the mixture used provided the scum of oil can drift over the whole area of water by wind action. Supposing that the wind were not favourable and an attempt were to be made to actually cover the whole superficial area by the mixture, it could be done at an expenditure of less than Rs. 50 and the effect of such a procedure will be more lasting. Of course, under working conditions, it is the edges of a tank only that require to be treated with larvicides. The combination is under further trial.

A series of basin experiments, mostly with *Stegomyia* larvæ, were also in progress in the mill dispensaries during this period. These were primarily started as demonstrations to the compounders, the clerks and the staff, by simply omitting to change the water in the washhand basins for about two weeks, so that the mosquitoes may lay their eggs. A point emerged during these demonstrations which may be utilised for practical purposes; if the mosquitoes in a household could be provided with a suitable receptacle such as a basin of shallow water in which to lay eggs and if the receptacle be watched so as to destroy the larvæ as soon as any in the basin "pupate," the mosquito population of the house can be appreciably diminished. This has been done in all the dispensaries for the last three months, with distinctly good results.

The above is an outline of the detailed report submitted by us to the agents, and a few generalisations and conclusions drawn from our experience may be stated:—

1. If a mill is driven by steam power, and if the water of the mill-lodge or tank is being used in the condenser, the danger of mosquito-breeding is *nil*.
2. In mills with electric drive, where the whole body of the water does not get heated, even though steaming water may occasionally be admitted into the tank, mosquito larvæ are able to breed.
3. Mosquito larvæ are susceptible to sudden meteorological and other unknown local influences which must be borne in mind in anti-mosquito work.
4. "Oiling" by a mixture of three parts of residual oil and two parts of kerosene, reinforced by 0.1 to 0.2 per cent. of castor-oil, at the rate

of about one gallon per each 100 square feet of surface may be depended on to control mosquito-breeding in millponds, and is feasible, cheap, easy to apply and efficient.

5. Such measures, however, thorough, cannot by themselves reduce the incidence of malarial fevers in the mill districts unless concerted action against all breeding places in a given locality is taken.

6. Incidentally, a simple method of keeping down the mosquito population of a household has been described.

Finally, we have to thank Captain Chalam for his interest in the work, and Messrs. E. D. Sassoon & Co. for affording us facilities and sanctioning the expenditure involved.

THE TREATMENT OF PLAGUE; A NEW SUGGESTION.

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(A paper read at the Kodaikanal Conference of the Medical Missionary Association of India on the 27th May, 1926.)

In spite of the presence of plague amidst us for the past 30 years, and the loss of over 10 million lives from it during the period, the treatment of the disease after the infection has occurred, it will be admitted, is still unsatisfactory, and although numerous remedies have been suggested and tried, they have not so far proved successful.

The advice given by Osler in the treatment of plague is as follows:—"In a disease the mortality of which may reach as high as 80 or 90 per cent., the question of treatment resolves itself into making the patient as comfortable as possible, and following out certain general principles, such as guide us in the case of fever patients."

Now, as plague is caused by *B. pestis*, one would expect that the most successful method of combating the infection would be by the use of its specific anti-serum. The serum commonly used for this purpose is Yersin's; Dr. Choksey, who has tried it extensively, recommends that it should be administered in large doses, 50 to 100 c.c. or even more on the first day according to the condition of the patient, and repeated as necessary. In his series of 400 consecutive cases conducted at the Maratha Plague Hospital in Bombay (moribund and convalescent patients being excluded), and treated alternately with Yersin's serum, the mortality was as follows:—

200 cases treated with serum, mortality 63.5 per cent.

200 controls treated without serum, mortality 74.0 per cent.

Difference in favour of serum—10.5 per cent.

The Plague Research Commission also tried this serum in 444 cases of plague. They examined each case bacteriologically by planting out on agar slopes $\frac{1}{4}$ c.c. of blood from every patient, and according to the number of colonies of

plague bacilli which developed on that medium, they divided all their cases into the following four groups of septicæmias:—

(1) Blood sterile in $\frac{1}{4}$ c.c. of blood = septicæmia 0

(2) 1 to 10 colonies in $\frac{1}{4}$ c.c. of blood = septicæmia +

(3) 11 to 100 colonies in $\frac{1}{4}$ c.c. of blood = septicæmia ++

(4) Above 100 colonies in $\frac{1}{4}$ c.c. of blood = septicæmia +++

Alternate cases received the serum treatment, the moribunds and convalescents being excluded.

The results were as follows:—

Septicæmia.	CASES TREATED WITH SERUM.		CONTROL CASES.	
	Cases.	Mortality.	Cases.	Mortality.
0	85	26.0%	70	34.0%
+	47	74.5%	47	74.5%
++	15	100.0%	24	100.0%
+++	75	100.0%	81	100.0%
TOTAL ..	222		222	

It will be seen from the above table that in the higher grades of septicæmia the mortality was 100 per cent. in spite of the serum. In slight septicæmia, the mortality was the same (74.5 per cent.) in those treated with the serum, as well as in the controls. In sterile cases, however, there was an advantage in favour of the serum by 8 cases in 100. But the Plague Commission were of opinion that this difference was not large enough in such a small number of cases to indicate any definite influence of the serum, and did not satisfy the statistical test for error due to "random sampling."

Tincture of iodine has also been recommended for the treatment of plague, and an experiment with it was conducted by the Director of the Bombay Bacteriological Laboratory—now the Haffkine Institute—on sixty cases of plague in the Maratha Plague Hospital. Twenty of these cases received the ordinary treatment as adopted by Dr. Choksey, the Medical Officer in charge. Twenty were treated with 5 drops of tincture of iodine administered every three hours by the mouth. Twenty others were treated by intravenous injections of seven minims of the tincture every twenty-four hours.

The table given below shows the result of this treatment in each group, the cases being classified according to the degree of septicæmia present:—

Treatment.	DEGREE OF SEPTICÆMIA.								Total treated.	
	0		+		++		+++			
	R	D	R	D	R	D	R	D	R	D
Ordinary (controls) ..	3	4	1	1	0	3	0	8	4	16
Iodine by mouth ..	6	3	2	1	0	1	0	7	8	12
Iodine intravenously ..	3	4	0	3	0	3	0	7	3	17
TOTAL ..	12	11	3	5	0	7	0	22	15	45

It will be noticed from the above table that in all the three groups the results in the higher degrees of septicæmia were invariably fatal. If, however, these invariably fatal cases are excluded, it is seen that in the groups in which recovery was possible (i.e., in those cases which were sterile, or which showed less than 10 plague bacilli in $\frac{1}{4}$ c.c. of blood) there were 4 recoveries out of 9 cases among the controls, 8 recoveries out of 12 cases treated with iodine by the mouth, and 3 recoveries out of 10 cases treated with intravenous injections of iodine.

The number of cases treated in this series is not sufficiently large to allow any definite conclusions to be drawn regarding the comparative efficacy of any of the methods of treatment; but it will be observed that while the cases which recovered after treatment with iodine by the mouth were more numerous, the numbers which recovered after the intravenous use of iodine—a much more effective method of administering this drug—were less numerous than those treated by the ordinary method followed in the hospital.

The bacteriophages of d'Herelle, the so-called "parasites of bacteria" have a lytic action on the corresponding micro-organisms, and "anti-plague bacteriophage" is, therefore, another remedy suggested for the treatment of plague. It has been tried in Egypt and I understand that it is now being given a trial on a large scale in some of the plague-infected towns in Upper India; but the results are not yet known.

The treatment of plague about to be suggested in this paper is based upon certain bacteriological, physiological and clinical data.

It is a well-known fact that some bacteria when placed under unfavourable conditions undergo peculiar degenerative changes; their growth and multiplication take place with difficulty; they lose their usual characteristic shape, and assume extraordinarily irregular forms; their staining power becomes altered, and most of them are found to be dead. These appearances, known as "involution forms," are very commonly met with in old plague cultures, and can be readily produced in a fresh culture by the addition of 2 to 5 per cent. of sodium chloride to the culture medium.

It has occurred to me that advantage might be taken of this phenomenon in the treatment of plague.

Laboratory experiments have proved that intravenous injection of hypertonic salt solution in animals causes a decrease in the size of the brain, reduces congestion of that organ, and produces a fall in cerebro-spinal pressure. It has, therefore, been highly recommended in cerebral hernia; and clinically it has been shown that 100 c.c. of a 15 per cent. salt solution may be injected intravenously in human beings without any harmful effects.

As a result of increased chlorides injected into the blood, the body is found to respond by

pouring water from the organs and tissues into the blood stream.

The withdrawal of water from the brain reduces the cerebro-spinal pressure and relieves headache and stupor, and the withdrawal of water from the tissues and internal organs considerably lessens their congestion and hyperæmia, the plasma becoming isotonic again on account of the water that is thus poured out into the blood stream.

In those cases of cerebral hernia where this treatment with hypertonic salt solution has actually been carried out, it was found that there was no impairment of the red blood corpuscles; the oxygen-carrying power of the hæmoglobin appeared to be intact; no free hæmoglobin was detected spectroscopically and there was no increase in bile pigments.

It is thus evident that intravenous injection of 100 c.c. of a 15 per cent. salt solution is not attended with any danger, and it would seem that if such a solution were injected also in cases of plague, it should, by reducing the congestion of the brain, relieve the cerebral symptoms so common in that disease. It would, moreover, not only help to relieve the congestion of the liver, spleen, and other internal organs but, by flushing the kidneys and the intestines, also remove the toxins from the general circulation.

The withdrawal of water from the tissues should assist in relieving the congestion, tension and pain from the buboes, and also in reducing the infiltration around them.

In addition to relieving all these symptoms, the hypertonic salt solution is extremely likely to have a specific action on the bacilli themselves, whether in the circulation or lodged in tissues and organs, by checking their multiplication and growth, and causing their degeneration and ultimate destruction.

The treatment suggested above is not only simple and harmless, but is rational, being based upon experimental facts and clinical experience; and it is hoped that those who have to deal with epidemics of plague, and get opportunities of treating cases, will give it a thorough trial.

It is not possible here to indicate the exact method of treatment, but it might be carried out on the following lines:—

A stock solution composed of.

Sodium chloride pure, 150 grammes

Distilled water, 1,000 c.c.

should be kept ready for use, sterilised either in an autoclave or by boiling.

Of this 15 per cent. solution, 50 to 100 c.c. should be injected at a time intravenously with the usual aseptic precautions.

The temperature of the salt solution at the time of injection should be 100°F.

The injections should be given slowly once or twice a day, or even more often, depending upon the condition of the patient; and repeated on the following days as necessary, a strict watch being

kept on the increase of bile pigments in the urine.

The ordinary treatment for supporting the heart's action with adrenalin and similar drugs should not be omitted.

Alcohol should be withheld unless found absolutely necessary.

Surgical interference will, of course, be needed when a bubo has suppurated.

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COMMON-SENSE IN ADVISING "A CHANGE OF CLIMATE" TO TUBERCULOUS PATIENTS.

By R. KRISHNA, M.B., B.S.,
 King Edward VIIIth Sanatorium, Bhawal, U. P.

A PATIENT should never be advised to go to a place which his medical adviser has not either visited himself or about which he is not thoroughly well-informed. There are important points about a health-resort, and unless the physician acquaints himself with them, his advice to a patient to go for "a change" cannot be regarded as sound. If a medical adviser has not this knowledge and experience he will find it to the interest of both the patient and himself to leave the matter in the hands of others who have such knowledge and experience.

Before advising a tuberculous patient to go to a health-resort or a sanatorium one should satisfy oneself on the following points:—

(a) Has the patient sufficient means to rent a suitable house or rooms and to bear the expenses of living comfortably in the hills and for the necessary treatment?

(b) Is the patient in a fit condition to undertake the journey? No patient with high fever should be sent on a journey unless for very urgent reasons, and then only with proper arrangements made for travelling, for rest at intermediate stations, and for proper feeding on the way.

(c) Are suitable, sanitary, and well-ventilated quarters available at the place to which the patient is advised to go?

Anyone who has been to a sanatorium or a health-resort knows well that many patients come to the place without having first made enquiries as to whether suitable accommodation is available or not, and the inconveniences they are thereby needlessly put to for want of forethought.

(d) Is suitable medical assistance available?

(e) Is the case suitable for treatment at a high altitude?

INDICATIONS FOR SENDING PATIENTS TO A HILL SANATORIUM.

- (a) Early and incipient cases of tuberculosis.
 (b) Chronic cases with little or no fever.

(c) Fibroid cases in which the area of disease is limited.

(d) Cases which have recovered from primary hæmoptysis with little or no signs.

(e) Marked fibroid disease in one lung and very slight affection of the other, fever absent or moderate, nutrition of the patient good.

(f) The presence of a cavity need not necessarily be a contra-indication as long as careful attention is given to the following points:—

(1) The degree of activity of the morbid process, as judged by toxæmic symptoms, e.g., fever, pulse rate, cough, etc.

(2) The general condition and bodily strength of the patient.

(3) His ability to withstand cold.

(g) Cases of tuberculous pleurisy with infiltration of the lung in an early stage.

CONTRA-INDICATIONS.

(a) The presence of such complications as albuminuria, diabetes, valvular disease of the heart, or extensive emphysema.

(b) Very advanced cases with high fever.

(c) Extreme emaciation.

(d) Decided inability to withstand cold.

(e) Neurasthenics.

Before sending a patient to a hill-station or a health-resort, there must be impressed upon him:—

(1) the harmful effects of spitting in public;

(2) the necessity of using a sputum cup or sputum flask;

(3) the general routine that he should follow regarding the taking of his temperature, his food and the need for rest at regular hours; and

(4) the necessity of seeing his medical adviser whenever necessary.

The utmost emphasis should be laid on the necessity for *entire rest in bed*, even if there be no fever. It is all very well to advise a slightly-out-of-health tuberculous patient to go to a hill-station, but it is almost criminal to advise him "to walk about in the open air as much as possible."

A Mirror of Hospital Practice.

A LESION OF THE INFERIOR RECTUS: TREATMENT: RESULT.

By CAPT. M. M. CRUICKSHANK, B.SC.,
 M.D., D.O.M.S., I.M.S.,
 Rawalpindi.

THIS case is of interest because of certain points which arose during the course of treatment and which might be considered in operative treatment of the muscles of a severely injured eye.

Private G. E. was admitted to hospital suffering from a severe contusion of the left eye. He stated that on September 1st, while bathing

in the Kabul river he dived from the bank into the water, a branch of a partly submerged tree striking his left eye.

Examination of the eye revealed two small lacerated wounds at the margin of the upper lid and a lacerated wound of the conjunctiva over the lower half of the globe, extending backward to the insertion of the inferior rectus. There was considerable œdema and discolouration of the lids, marked conjunctival injection and chemosis and an abrasion of the corneal epithelium. There was no injury to the lens and a few floating vitreous opacities could just be made out. Fundus examination revealed nothing abnormal. There was a very definite upward deviation of the left eyeball, the left lower corneal limbus lying on a plane 4 mm. higher than that on the right side. Limitation of downward movement of the left eye was marked and a diagnosis of injury to the inferior rectus was made. Examination with the Maddox scale revealed 7 prism-diopters of upward deviation with 4 prism-diopters of lateral deviation of the left eye. There was no tilting of the false image save at the extreme right periphery of the visual field, nor was the lateral deviation present above the horizontal plane (fig. 1). There was therefore no case of the inferior rectus unmasking an exophoria.

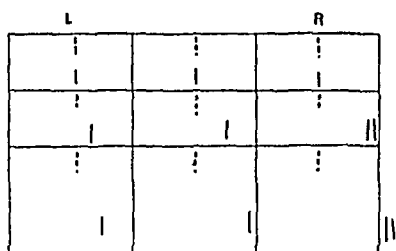


Fig 1.

Chart of the diplopia present after the injury to the left inferior rectus.

The diplopia increasing in the direction of greatest action of the paralysed muscle ; i.e. downwards and to the right.

The dotted line denotes the true image ; that of the right eye.

The continuous line denotes the false image, that of the left eye.

The lateral deviation of the false image below the horizontal plane in a paralysis of an inferior rectus is due to the fact that the muscles concerned in moving the eyeball directly downward are the inferior rectus and the superior oblique. If the inferior rectus is paralysed then the superior oblique acting alone rotates the globe outwards and downwards and causes intorsion, with the result that below the horizontal plane there is a crossed diplopia with tilting of the false image toward the true one. The tilting becomes noticeable in the direction of the greatest degree of diplopia, that is in the periphery of the field, the power of the oblique muscles being

greatest when the eye is turned outward (fig. 2).

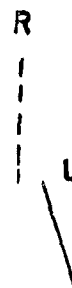


Fig. 2.

Position of the images in the periphery of the field in a paralysis of the left inferior rectus.

On November 8th, under Borocaine anaesthesia, the left inferior rectus was exposed. The muscle was found severed within three millimetres of its insertion and embedded in fibrous tissue, which matted conjunctiva and Tenon's capsule to the globe. The adhesions were broken down as completely as possible, the muscle defined and the ends sutured.

The result was that the upward deviation was corrected by 3 prism-diopters, that is by less than half, and the lateral deviation remained the same, that is 4 prism-diopters.

On December 1st, a recession of the superior rectus was done, because it was found by testing with a Maddox rod on the operating table, that a complete tenotomy over-corrected the error by 1 prism-diopter. The result was good, there being no apparent vertical deviation. As the eye quietened down, however, it was seen to deviate gradually more and more upward and two weeks after the second operation there was again 7 prism-diopters to 8 prism-diopters of upward deviation of the left eye.

The patient was given a shade because of the diplopia present and returned to duty with instructions to report again in three months' time.

The question which now arose was, why had the eye again deviated upward?

That the sutured inferior rectus had stretched was possible, that the recessed superior rectus had contracted in the healing process was equally possible.

The patient then was sent away uncured and asked to return in three months for further treatment when it was hoped that all contraction of fibrous tissue, which might occur during the healing of wounds on the damaged globe, would have ceased.

The patient returned on March 8th, 1926, when measurement on the Maddox scale showed that both the outward and the upward deviation had increased. With a 5°d prism base in before the left eye, the false image lay directly 7° below the true image, a 6°d prism base down causing the two images to fuse. This meant that there was now a lateral deviation of 9

prism-diopters and a vertical deviation of 11 prism-diopters.

It is difficult to account for so much lateral deviation having developed. The increase of the upward deviation was due, as further operative measures showed, to the development of adhesions about the tendon of the superior rectus, along with attenuation and lengthening of the inferior rectus tendon, but it is difficult to assume that the loss of the adduction power of the inferior rectus could account for so much outward deviation.

The idea which now occurred to me was to advance the inferior rectus and to place the new insertion of the tendon slightly medially, in the hope that the increased inward rotation due to the more medial position of the muscle would tend to correct the lateral deviation, and bring the images within the normal limits of prism duction. The fact that the torsion effect of the inferior rectus in its new position would be less and that of the superior oblique more and would so produce an *upward* tilt of the image, that is a tilt toward the left and toward the true image, was not forgotten (*vide* fig. 2).

The normal limits of prism duction are (1):—

superduction	$1\frac{1}{2}^{\circ}$	$2\frac{1}{2}^{\circ}$
subduction	$1\frac{1}{2}^{\circ}$	$2\frac{1}{2}^{\circ}$
abduction	4°	5°

cannot be increased by practice, yet in cases of herterophoria it is only necessary to bring the image within the range of this duction power and the fusion sense will do the rest.

The law governing the fusion of images which are not precisely similar is stated as follows:

"When the images formed in the two eyes differ in shape (size), or position, if the disparity be not too great, the oculomotor apparatus first places the eyes in the most favourable relative positions, the fusion sense by virtue of its elasticity, then fills up any gap which may remain" (1).

On March 13th, under Borocaine anesthesia the inferior rectus was defined and the thinned tendon advanced to within an eighth of an inch of the corneal margin, and sutured to the sclera slightly medially to what would have been the normal continuation of the tendon.

On March 27th, when the stitches were removed, the eye was noticed to deviate very slightly upwards and outwards. This deviation had to be carefully looked for to be appreciated.

On March 29th, examination with the Maddox scale revealed a divergence outwards of 3 prism-diopters and upwards of 3 prism-diopters. The upper end of the Maddox scale was also tilted very slightly to the left, that is the false image was tilted outwards (fig. 3).

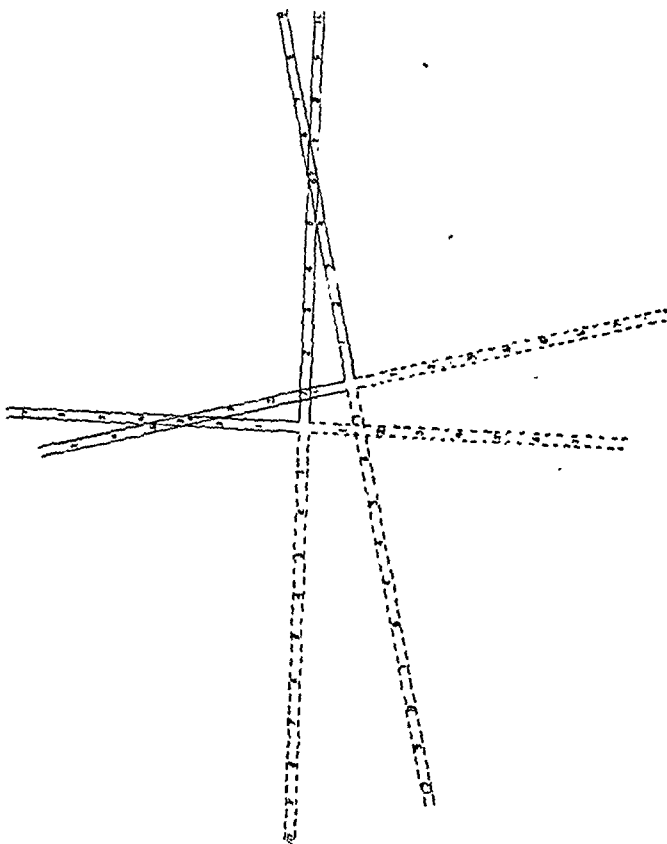


Fig. 3.

and while the degree of prism duction does not vary, is independent of voluntary control and

As the patient looked at the centre light on the scale, the images tended to become

super-imposed and by a slight effort of will on his part the images could be readily fused. This fusing of the images could be brought about without effort if the patient tilted his head 10° to 12° to the right.

The patient was advised to try the effect of exercises for a couple of weeks and to report results. The exercises were merely attempts on his part to focus objects such as electric lights, and, without resorting to tilting of the head, to endeavour, by an effort of the will, to fuse the images.

Two weeks later he again reported for examination and stated that the diplopia had largely disappeared and that only when attention was relaxed did the images tend to drift apart.

Curiously enough when he made no effort to fuse the images the vertical bar of the Maddox scale remained vertical, while the horizontal bar tended to retain the slight degree of tilt, the extreme right end of the bar being raised by about its own breadth above the normal level, while the left end was correspondingly depressed. The false images of the figures were also deviated slightly to the right. As the patient put it, "the dotted 7 is almost under the dotted 6, while the black 7 is almost above the black 8," showing that when effort was relaxed an "exophoria" of just under 1° was present together with a slight tilt (fig. 4).

possible was in great measure due to the cheery fortitude of the patient whom pain, discomfort and failure even did not daunt.

Several points occur to one which might serve to explain the failure of the treatment in the first place, and which might suggest lines of treatment for such cases in the future.

(1) Was it the correct procedure to allow the torn and badly traumatised muscle and conjunctiva to heal and the eye to become quiet before operative treatment was undertaken? In the case of a badly traumatised eye a certain amount of delay will be inevitable to allow chemosis and swelling of the lids to subside, but to wait till the eye becomes quiet as I did in the above case, for two months, would not, I now think, be the best line of treatment to adopt.

By postponing operation I was faced with the task of dissecting out a muscle, which with the conjunctiva was matted to the sclera by dense adhesions extending well back toward the equator of the globe.

Were I faced with the same condition again I would expose the muscle as soon as possible, suture the torn ends, and endeavour to prevent gross adhesions to the globe by smearing the muscle surfaces with sterile vaseline.

(2) The results of muscle operations on the normal eye can be judged at the time of operation, but when dealing with a severely

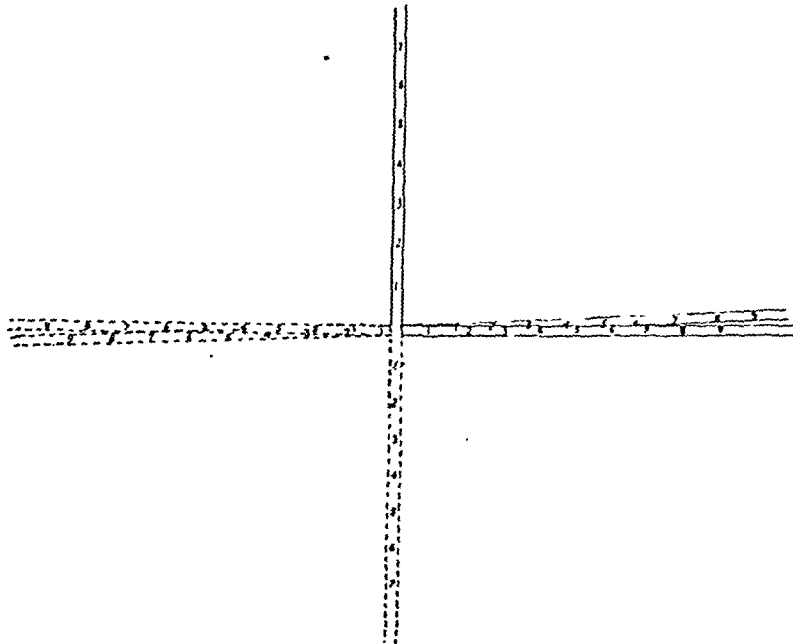


Fig. 4.

How much of this fortunate result could be ascribed to the will effort on the patient's part, or to the fact that he was unconsciously tilting his head, however slightly, it is difficult to say. Marked visual acuity in both eyes (R. V. and L. V. = 6/5) and a well developed fusion sense doubtless played a big part. That the result was

injured eye the result apparent on the operating table will not be the final one. In the healing process adhesions will form uniting the muscle to the globe, increasing its area of insertion and so limiting movement in the direction of action of the muscle concerned, a factor tending finally to under-correct the error.

Again the same applies to operative procedures on muscles away from the site of injury, because the full extent of the trauma cannot be determined. One might argue from this that the best procedure would be to postpone all operative treatment for three months until the eye had become absolutely quiet, but then one would be faced with the task of dissecting out a fibrosed atrophic muscle from a tangled mass of adhesions.

This case is of interest in that should the patient elect to tilt his head to cause fusion of images it becomes one of acquired torticollis, a rare condition, these cases usually being of congenital origin.

Acquired cases have been reported where vertical movements have been disturbed as a result of operative procedures, usually in connection with the frontal sinus. In the assumed position squint is visible and diplopia is not present. (2)

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A CASE OF AMŒBIC ABSCESS OF THE LUNG.

By Capt. G. SHANKS, M.D., L.M.S.,

Professor of Pathology, Calcutta Medical College.

THIS interesting complication of amœbic dysentery was encountered in one of a series of thirty autopsies performed on prisoners of war who died in No. 1 British General Hospital, Mesopotamia, which was then under the Command of Lieutenant-Colonel (now Colonel) Perry, D.S.O., K.H.S., I.M.S. (June 1918).

The patient was a Turkish corporal who, on admission to hospital in an advanced state of emaciation, was found to be suffering from relapsing fever and amœbic dysentery.

The following is a resumé of the post-mortem findings:—

Lungs.—In the left lower lobe, in the anterior axillary line there was an abscess 1.5 cm. in diameter, near the pleural surface and containing chocolate-coloured, thick, purulent material.

Liver, spleen and kidneys.—Nothing of note.

Intestine.—For 20 cm. above the ileo-cæcal valve the surface of the ileum was markedly congested and showed superficial erosions.

The colon was slightly thickened and presented very extensive ulceration, particularly in the cæcum, at the splenic and hepatic flexures, and throughout the terminal 30 cm. of its length. In parts there were simply small islands and ridges of undermined mucosa.

On microscopical examination of the contents of the pulmonary abscess cavity and of the large intestine numerous typical living *Entamoeba histolytica* were found.

On culture of the mucus from the surface of the colon an agglutinating Flexner type of dysentery bacillus was secured.

I wish to thank Colonel Perry for permission to publish these notes.

A CASE OF BACILLARY DYSENTERY.

By Dr. SISIR C. CHATTERJEE, M.D. (Edin.),
M.R.C.P. (Edin.), D.P.H. (Edin.),
District Surgeon, G. I. P. Railway, Nagpur.

Mrs. G. W. C., aged 30, was journeying from Igatpuri to Nagpur but was taken ill at Wardha on the 18th April, 1926, where she gave birth to a (second) male child in the waiting-room, and then stayed with some friends at Wardha. She came to Nagpur on the 28th April to stay with friends. Up to the 5th of May she kept quite well, but on this day she began to pass dysenteric stools and was treated on ordinary lines by my assistant, Dr. Chitale. The course of the disease was as follows:—

6-5-1926. Emetine, half a grain; marked nausea followed.

7-5-1926. Temperature 102.4°F.; griping severe, motions mostly slime and blood. There was severe prostration. Emetine, half a grain, provoked marked nausea.

8-5-1926. Seen by me for the first time. Treated by drachm doses of sodium sulphate every hour. Bowel wash of saline. High temperature; griping and prostration marked.

9-5-1926. Temperature 104°F.: no malaria parasites found in blood films. Nausea still marked, cannot retain medicine. Treated by saline bowel wash only.

10-5-1926. Temperature between 102° and 104°F. Other symptoms the same as yesterday. Saline bowel washes continued.

11-5-1926. Temperature 98°F. but motions still full of blood and slime with griping and tenesmus.

12-5-1926. Temperature 98°F. Other symptoms as yesterday. Subcutaneous injection into both flanks of 20 c.c. of polyvalent anti-dysenteric serum.

13-5-1926. Great improvement. Motions twice but with blood and slime. All pain gone. No temperature.

14-5-1926. Progress good. One motion with blood.

15-5-1926. One motion with a little blood.

16-5-1926. Intravenous injection of anti-dysenteric serum 25 c.c. diluted with 50 c.c. of normal saline.

17-5-1926. Motions normal. Patient quite well.

28-5-1926. Patient quite well and healthy. Returned to Igatpuri.

Interesting points in the above case are:—

(1) The diagnosis of bacillary dysentery arrived at by the

(a) Presence of high temperature.

(b) Character of the stools.

(c) Failure on exhibition of emetine and castor-oil emulsion.

(2) The beneficial action of saline bowel washes early as the temperature came to normal by it alone.

(3) The marked improvement of all symptoms on the subcutaneous injection of anti-dysenteric serum.

(4) The total disappearance of all symptoms after the second dose of anti-dysenteric serum given intravenously.

(5) This case is of interest as bacillary dysentery is not common in these parts. This is the first case seen by me here. Other local doctors also confirm this.

(Note.—The above case is of interest in view of the almost universal habit of administering emetine in India in almost all cases of dysentery, irrespective of their causation. We believe that if Dr. S. C. Chatterjee would have the stools of all his cases of dysentery at Nagpur examined bacteriologically, he would find that what holds good for Calcutta, for most of India, and for the tropics generally, also holds good for Nagpur; that bacillary dysentery is some five to six times as common as is amoebic dysentery. The clinical features of the above case are those typical of bacillary dysentery.—Editor, *I. M. G.*).

UNUSUAL SYMPTOMS FOLLOWING THE ADMINISTRATION OF UREA-STIBAMINE.

By TARA PADA SEN GUPTA.

Begunjanj Dispensary, Noakhali District.

A MALE patient, aged about 60 years, came to me for treatment with a history of chronic fever, the spleen enlarged to 3 finger-breadths below the costal margin, and the liver to 1 finger-breadth. The aldehyde reaction was positive, and the case appeared to be one of kala-azar.

He received an injection of 0.05 gm. of urea-stibamine on the 23rd September 1925. There was no marked rise of temperature that day; the

something was passing under the skin of the hands, face and head, and that the application of cold water relieved him. These symptoms persisted for some seven to eight days, during which period no further injections of urea-stibamine were given. An alkaline mixture was given orally and syrup of hæmoglobin. The symptoms wore off gradually, though there was obstinate constipation. The urine was normal.

With the subsidence of the symptoms I began injections of sodium antimony tartrate, a 2 per cent. solution, starting with a dose of $\frac{3}{4}$ c.c., and increasing it by $\frac{1}{2}$ c.c. at every fourth injection. There was no further trouble, and the fever subsided after the 15th injection. He was given a further 12 injections and then discharged cured. The aldehyde test after recovery was negative.

A ONE-MAN APPARATUS FOR INTRA-VEINUS SALINE INFUSION.

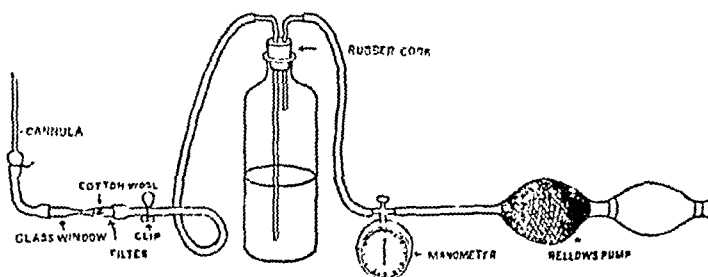
By CAPT. P. BARDHAN, M.B. (Cal.),

M.R.C.P. (Edin.), F.R.C.S. (Edin.),

and

SANAT KUMAR PALIT, M.B. (Cal.)

THE necessity for giving intravenous saline infusion under circumstances where any assistance is out of the question prompts us to make the following apparatus known to our brother practitioners.



urine was normal and free, but of a high colour; the bowels were normal. The next day however the patient became delirious and tried to run out of the room. On examining him I found that the temperature was 103° F.; pulse 130 to the minute and of low tension; respiration rate 40. He had passed neither urine nor faeces that day and the eyes were red and congested. I applied cold water to his head, injected 0.5 c.c. of pituitrin, and gave rectal injections of an alkaline solution, 4 ozs. at a time, repeated every hour.

After five such injections the patient passed about two ozs. of very highly coloured urine. This was acid, of normal reaction and did not contain any albumin. He now gradually became conscious.

The rectal injections were continued, and next day the temperature had fallen to 101° F.; urine was passed freely and the bowels were opened once. The urine was normal in all respects. A peculiar symptom shewn was that the patient continually dipped his face and head into water. On being questioned he explained that he felt as if

Description.—The apparatus consists of a four-pint bottle, marked in pints by etching the side of the bottle with an ordinary steel glass cutter. The cork is of india-rubber and is perforated with two holes. Through these holes two glass tubes are passed, tightly fitting on the same principle as in an ordinary wash-bottle. The longer tube which reaches within half an inch of the bottom of the bottle is for the cannula portion of the apparatus. The shorter tube is for the bellows air-pump and is connected with the manometer.

The cannula portion is made of a cannula, pointed or blunt, a glass window, rubber tubes connecting them together and with the bottle and a clip. The glass window is for a twofold purpose. Firstly, it is to show, when a pointed needle is used, that the needle is in the vein by noticing the flow of blood in it. Secondly, it is used as a filter to the solution by narrowing the middle portion of the glass tube and lightly stuffing the bottle-end of the tube with a piece of dry sterilised or boiled cotton-wool.

The other part of the apparatus consists of the manometric portion of an aneroid sphygmomanometer and a bellows air-pump, the manometer being interposed between the bottle and the pump.

Use.—The bottle is filled with sterilised saline solution, or saline tablets are put into the bottle and the required amount of distilled water is added. The bottle is then sterilised in a water-bath, e.g., in a *handi*. The fittings are now adjusted and the pump is worked with the clip closed till the manometer records 120 mm. pressure. The clip is pressed so that the air is driven out of the cannula portion of the apparatus and a steady flow of saline solution is obtained from the end of the cannula. The clip is then put on again and the cannula is introduced into a vein. When the cannula is in, the clip is finally released. It will be noticed that with a steady flow of saline into the vein a decrease of pressure within the bottle will be recorded by the needle of the manometer moving towards the zero. It is essential that the original pressure or a little higher, according to the necessities of the case, should be maintained by pressing the bulb as occasion arises. When the fluid in the bottle is exhausted to within an inch from the bottom, the working of the apparatus should be stopped, or the bottle be refilled with fresh solution.

We may mention that the bottle can be placed on the floor at a safe distance from the patient and the manometer can be fixed to the side of the bed for convenience.

It should further be noted that the manometer portion can be done away with altogether, if so desired.

Note.—The cotton-wool of the filter should be changed every time the apparatus is in use.

If it is intended that the apparatus should be kept sterilised for an emergency case, the bottle is corked and the ends of the glass tubes are stopped with sterile rubber caps, such as those used on vaccine phials of P. D. & Co.

Advantages.—(1) The apparatus is simple and handy. It can be put together by any practitioner in a wayside place with the following materials,—a bottle, glass and rubber tubing, a perforated rubber cork and a sphygmomanometer.

(2) It ensures a uniform flow of saline with great accuracy.

(3) Stoppage of the flow will be indicated by the manometer.

(4) It can be readily sterilised and kept sterilised for any length of time for emergency cases.

(5) The glass filter obviates any necessity for filtering the solution.

(6) A certain amount of sedimentation of any suspended particles from the solution to the bottom of the bottle helps infiltration.

This apparatus, at our suggestion, has been put together by Messrs. Lytton & Co., 30, Dharamtala Street, Calcutta.

A CASE OF DIFFUSE HYPERTROPHY OF THE BREASTS.

By NISANTH GHOSH, M.B.,
Assistant Surgeon, Karimganj, Assam.

ACCORDING to Rose and Carless' *Manual of Surgery* (11th edition, 1924, p. 1056), "diffuse hypertrophy of the breast consists of a general enlargement of the organ, both gland substance and interstitial tissue participating in the process, and hence the breast becomes both firm and indurated. It may be uni- or bi-lateral, perhaps more frequently the latter, and generally occurs in adolescents. The size varies considerably, but the breasts may become enormous, hanging down by their own weight, and perhaps to such an extent as to rest on the knees of the patient when sitting. They are usually painless, although sometimes neuralgia is noticed. Functionally they are useless, as even if the patient becomes pregnant secretion of milk but rarely occurs. No cause can be assigned for the overgrowth, and the only treatment is amputation when the increased size is causing discomfort." Enlargement of the male breast, or gynecomastia (when not due to fat), is said to be more common than diffuse hypertrophy of the female breast.

The following are particulars of a case of diffuse hypertrophy of the female breasts, which I had under treatment last year:—

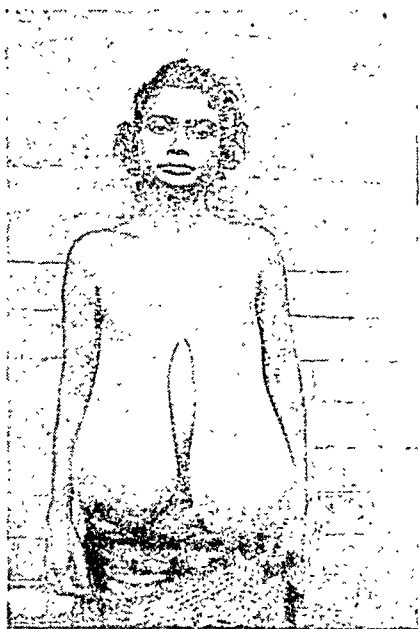
N. B., Mohamedan female, aged 20 years and widowed two years previously, also mother of a three-year old healthy child, sought admission to hospital on the 14-6-1925 for enormous size of both breasts, and for neuralgic pains in them. The huge size of the breasts and pain in them prevented her from doing the daily work upon which depended the daily bread of herself and of her son.

History.—About three years previously, two months after her confinement, she noticed that her breasts continued growing bigger and bigger, but the secretion of milk became more scanty than before. At about the sixth month after confinement the milk flow ceased entirely and the breasts became enormous, as shewn in the photograph. By degrees she began to feel neuralgic pains in the breasts.

Condition on Admission.—A short statured woman, not very well nourished, of a melancholy appearance. Nothing abnormal was noticed on general examination of the internal organs. Both breasts are enormously enlarged, hanging down to the thighs and two inches below the anterior superior iliac spine when she is in the erect posture, and resting on her lap when sitting. The left breast was two inches longer than the right, and its nipple was deviated outwards. Both breasts looked smooth, but felt nodular and hard in places on deep palpation. There was no secretion of milk and no tenderness, but neuralgic pains were complained of. The neighbouring lymph glands were normal and not enlarged; the

uterus, ovaries and Fallopian tubes were normal, and menstruation was normal.

Operation.—On the 16-6-25 amputation of both breasts was performed under chloroform anæsthesia in one sitting; the left breast being dealt with by myself and the right breast by my assistant, sub-assistant surgeon M. C. Chowdhury, simultaneously. Elliptical incisions, lying transversely, were used. After removal the right breast weighed 7 lbs. and the left one 9 lbs., the weight of the patient before removal of the breasts being about 72 lbs. and her height 4 feet 9½ inches.



During the operation the very much enlarged blood vessels supplying the enlarged breasts afforded splendid opportunities of securing them by ligature before their division.

On the 17-6-1925 the patient's temperature rose to 100° F., but dropped to normal the next day. The stitches were removed on the 8th day, and except for a small superficial ulcer in the wound on the right side, she made an uneventful recovery. She was subsequently discharged cured and with a much happier expression than she had come in with.

It is interesting to note that in this case the abnormality occurred after childbirth and not during adolescence; also that it commenced in glands which were apparently functioning normally after childbirth.

My thanks are due to my hospital staff for their assistance and for their care of the patient.

A CASE OF ACUTE INTESTINAL OBSTRUCTION CAUSED BY *ASCARIS LUMBRICOIDES*.

By H. B. D. NANHORYA, M.B., B.S. (Bom.),
Assistant Surgeon, Main Hospital, Raipur.

ON the morning of the 9th March, 1926, a Mohammedan boy about 3 years old was

brought to the outdoor department of the Main Hospital, Raipur, for severe abdominal pain. The history given was that two days before he developed high fever and next day vomited twice. On the morning of admission he was suddenly attacked with acute pain in the abdomen and had vomited four or five times. The relatives of the patient said that he had passed no motion for 24 hours, but the day before the bowels had moved once and the colour and the consistency of the stools was normal. They also gave no history of the child having ever suffered from round-worms, although questioned regarding this.

The child was apparently in great agony and was crying all the time. What appeared to be visible peristalsis was noticed in the right hypochondriac region. The patient would not allow palpation or any examination of the abdomen, and hence chloroform was given. Under the anæsthetic, a firm semi-circular mass about 1½ inches in diameter was felt starting from below the right costal margin and running downwards and inwards to about midway between the umbilicus and the symphysis pubis. The temperature was 99.4° F., respirations were hurried and shallow, and the pulse was weak, thready and fast. A provisional diagnosis of intussusception was made and the relatives were advised of the necessity for immediate operation, after explaining to them the gravity of the situation. They at first refused to allow operation, but about two hours later consented.

The child was put under chloroform and an incision in the median line from the umbilicus to the symphysis pubis was made. On opening the peritoneum some clear serous exudate escaped. The hard portion of the gut about a foot long was brought out. It was found dilated and the intestinal wall so extremely thinned and translucent that a mass of round-worms could be easily seen through it packed tightly together like cigarettes in a round tin. A purse-string suture was inserted in the anti-mesenteric border of the gut and a small incision made inside this area, the other portions of the intestines being in the meantime protected with abdominal towels soaked in hot saline. Thirty-seven round-worms were seized one after another in an artery forceps and drawn out through this aperture and the obstruction thus relieved. Other worms were detected above and below this area but they were left as they could not be reached through the opening in the intestine without grave risk of infecting the peritoneal cavity, and moreover they were not obstructing the lumen of the gut and hence were left to be passed afterwards. The purse-string suture was closed. The wound in the intestines was then swabbed with acriflavine lotion 1-1000 and a little "Bipp"

applied. The peritoneal coat of the intestine was drawn over it by Lembert sutures. The intestines were returned to the abdominal cavity, the abdominal wall was closed layer by layer, and the wound dressed aseptically.

10th March, 1926.—The temperature came down to 97 °F. in the morning. He passed urine and the bowels moved once. His pulse was good, 100 per minute, but he was still drowsy and tympanites was present. He vomited twice during the day. Rectal saline was continued and a powder containing calomel, half a grain; compound scammonii powder, two grains; and santonin, one grain, was given. In the evening the temperature rose to 99 °F. but the pulse was good and the patient was brighter. Blood films did not show any malarial parasites.

11th March, 1926.—The temperature rose to 100.8 °F. No more vomiting occurred. He passed one motion containing two worms. The pulse was good and meteorism had disappeared. The patient passed 14 worms in all during the day.

12th March, 1926.—The patient passed 4 worms and his general condition improved very much. The temperature was coming down slowly. After this the patient made an uneventful recovery, passing daily a number of worms.

Santonin was again administered with calomel and pulv. scammonii co. on the 15th March, 1926, and the stitches were also removed the same day, the wound healing up by first intention. The patient passed in all 43 worms in addition to the 37 worms removed at the time of the operation, totalling 80 worms in all. He left the hospital on the 19th March, 1926. He was seen again on the 22nd in perfect health and having passed no more worms.

The operation was performed by my chief, Lieutenant-Colonel W. J. Fraser, I.M.S., Civil Surgeon, Raipur, and I am indebted to him for kindly according permission to my publishing these notes on the case.

A NOTE ON THE TREATMENT OF PUERPERAL INFECTION.

By A. C. BHARADWAJ, L.M.P.,

House Surgeon, King Edward VII Hospital, Benares.

OWING to the ignorance of the lay public and to the scarcity of trained midwives, the incidence of puerperal infection in India is increasing. The methods adopted by the ignorant and indigenous *dais* are well known to the medical profession, who never fail to impress on their patients the necessity for securing qualified medical aid at the time of delivery. But, apart from the uneducated

masses, it is amazing how educated Indians will shew a total disregard of this useful advice: the result is a deplorable infantile mortality, and often a tedious puerperin which not infrequently also ends in the death of the mother. I have come across more than a score of such cases at Benares during a period of a year and a half. It is remarkable that these cases should occur amongst an educated Indian community and in a town where skilled medical aid, both male and female, is easily available. It is very difficult to convince the public of the necessity for careful management of delivery and of the consequent diminution in the incidence of puerperal sepsis. Under such circumstances it is necessary that, when called upon to deal with such a case, we should make a prompt diagnosis and follow a line of treatment which gives best results.

In outlying dispensaries where there are no facilities for modern methods of diagnosis mistakes are liable to occur; but I have seen cases in city practice which, though attended by experienced medical men, were not diagnosed in the early stages; and where the delay in diagnosis resulted either in the death of the patient or in the supervention of chronic pyæmia.

The greatest blunder which one is apt to commit is to confuse puerperal infection with either "milk fever" or with malaria. For this there is no excuse. "Milk fever" is a fallacious term, as no rise of temperature occurs with the advent of milk in the breasts unless there is also a concomitant mastitis, the signs of which are usually obvious. Malaria can be proved or excluded by microscopical examination of the blood. In all cases where labour has been protracted and where the *dai* has carried out her filthy ministrations, it is safe to assume that septic infection has occurred, and to take steps to combat it.

A typical case may here be cited. A girl, a primipara, had a very troublesome and protracted labour. She was roughly handled by a *dai* who tried to extract the child with her dirty hands. On the fourth day after delivery all the symptoms of puerperal infection developed, but the unfortunate patient was treated with anti-malarial remedies, with the result that severe pyæmia set in. Sepsis assumed a chronic form, and to-day—six months later—she is bed-ridden and a mere skeleton of flesh and bone. That is what the *dai* is responsible for in India.

Of the different varieties of puerperal infection, lymphatic sepsis, acute venous sepsis, sapræmia, pyæmia and septicæmia are the more important. For sapræmia and retained lochia due to misplacement of the uterus prompt local interference is necessary, but only when it is imperative. Owing to the

prejudice of the *purdah* one cannot treat such cases personally, but is compelled to call in the assistance of a lady doctor or of a trained midwife.

In other cases I have followed a uniform plan of treatment which has given very satisfactory results. On being called in to see a case of puerperal infection, the first thing which I do is to raise the head of the bed and to prop up the patient with a bed rest or pillows. This facilitates drainage, and although a simple measure, is one which is very useful. The second step is to douche the vaginal canal with a hot lotion of one drachm of tincture of iodine (rectificatus) to the pint of water. The douche is repeated morning and evening until the lochia regain their normal colour. The patient should be warned against the custom of using a dirty cloth to wipe away the vaginal discharge, a custom which is very common amongst Indian women and which probably accounts for the chronic leucorrhoea from which about 70 per cent. of them suffer. They should be advised to use sterilised absorbent cotton-wool for this purpose.

Irrespective of the type of infection present, I then give an initial injection of one c.c. of "Mixed Infection Phylacogen" (P. D. & Co.). This never appears to cause a febrile reaction; on the other hand the temperature usually drops considerably within 24 hours. The patient is then given a dose every four hours of a quinine and ergot mixture to which magnesium sulphate in one drachm doses may be added if she is constipated. On the second and third days a dose of two c.c. of the same Phylacogen is given, and thereafter a similar dose every other day until the symptoms have subsided.

Under such a routine regimen in the majority of cases the patient's condition improves from the beginning, and she becomes convalescent in five to six days. I have given Phylacogen injections to patients with a temperature of 105°F., and have noted no reaction. The injection always appears to have a markedly beneficial effect on such cases. I have hitherto usually given it subcutaneously.

INTRAMUSCULAR QUININE INJECTIONS IN MALARIA.

By A. VISWANATHAN, L.M.P.,

Civil Hospital, Papun, Salween, Burma.

COLONEL PROCTOR is positive in his assertion that "nothing would induce him to have an intramuscular injection of quinine" because of the possible risk of tetanus or abscesses as a result of it (*Indian Medical Gazette*; March 1926, p. 110.). Similar

experiences are being published in the same journal from time to time.

My experience of over 300 quinine injections has led me to believe that the injection is not so dangerous as is believed by some, provided that certain precautions are taken:—

(a) Scrupulous aseptic precautions for the syringe, the physician's hand and above all at the site of injection.

(b) The selection of the site for injection. The upper and outer part of the gluteal region is the ideal site. I have seen cases come to me with a history of quinine injection in the gluteal region having subsequently developed a limp owing, most probably, to injection into the sciatic and other big nerves in that region. Painful swellings, induration, etc., are common if the injection be given into the shoulder or the scapular region.

(c) The selection of cases, as far as possible. Stout, muscular persons do not feel much after-pain, save some slight heaviness for a day or two. It is the weak and nervous patients alone who complain of painful swelling and in them it results in induration which takes a long time, sometimes more than a year, to disappear completely.

(d) Gentle massage is very essential after injection.

(e) Too strong a solution gives pain. I always inject 5 grs. in 20 minims of distilled water. If this dose is not sufficient, it may be repeated. Whenever I used a stronger solution it invariably gave a certain amount of pain.

(f) The puncture should be sealed with compound benzoin tincture or collodium flexile. Simple painting with tincture of iodine leaves the puncture open to all possible chances of infection.

(g) The solution should not be aspirated into the syringe with the needle to be used for injection, as it sticks to the external surface of the needle which in its passage deposits the solution in the subcutaneous tissue, thus causing pain and swelling later on. Parke Davis & Co.'s syringes are always provided with a filling needle. This can be detached after filling the syringe and the injection needle inserted in its place, taking care to drive the air in the needle out before injection. After the injection the needle should be withdrawn quickly, as otherwise there is the danger of the solution oozing into the subcutaneous tissues which will cause pain later on.

I have observed all these precautions invariably: any pain and swelling was traceable to faulty technique. Fortunately in my series there was no case of tetanus or abscess. I am still unconvinced as to the supposed dangers of intramuscular quinine injection. They are probably traceable to (1) want of proper aseptic precautions; (2) improper selection of cases; and (3) a wrong site of injection.

Indian Medical Gazette.

AUGUST.

VITAMINES.

THE time has not yet come to tell the whole story of the vitamins, for although we know a great deal about them, we cannot give the exact chemical formula of any of them.

Certain Japanese workers have claimed to have isolated some of them in a pure condition, but these claims are not yet admitted by the European experts.

Our knowledge of the vitamins has been built up by various methods: it would have been possible for Hippocrates to find out nearly all that we know of the vitamins from a practical point of view, so simple have been the methods of research into their properties. Neither the microscope nor the test-tube is needed to find out the food-stuffs which contain the vitamins, it is merely a question of observing what happens to animals which are fed on certain articles of diet. If an animal gets scurvy it is clear that the diet is deficient in the substance which prevents scurvy; in other words, it does not contain enough of the antiscorbutic vitamin. By giving the animal certain food-stuffs the disease is cured, and so we know that these food-stuffs contain the vitamin in question.

It is strange that our knowledge of vitamins should have been obtained long after we found out the chemical constitution of the proteins, carbohydrates and fats, although this knowledge could be secured only by the use of the complicated methods of modern chemistry. Here we have a striking example of the fact that we have overlooked many important pieces of information which have been before our very eyes while we have toiled incessantly in the acquisition of knowledge which has been of no greater value, but has been much more difficult to secure. Even now our scientists show a tendency to devote an undue amount of attention to the academic aspects of the vitamins while there is still so much to learn about them which is of great practical importance.

The story of the vitamins is interesting from another point of view; it illustrates the pitfalls which lie in the path of human beings when they strive to better their environment.

Uncivilised man lived on a precarious diet, but he could hardly have suffered from vitamin deficiency to any important extent. It was the adoption of artificial methods of storing and cooking food-stuffs that brought rickets and scurvy into prominence. Nature is always apt to resent a disturbance of the balance which she has established through the centuries, and it

behoves us to keep a careful watch lest we incur a penalty for our interference with the established order of things. In the case of the vitamins we suffered for many years, not because of modern scientific methods, but because our methods were incompletely scientific.

It was a case of the "little learning" that is so dangerous. We hardly realised how many of our diseases result from the artificial conditions under which we live; houses were constructed to improve human environment but they brought in their train a host of diseases such as tuberculosis and respiratory infections in general; rapid means of travel brought with them the rapid conveyance of disease; clothing is responsible for certain diseases; indeed there is hardly any development of civilization that has not brought in its wake a number of ailments.

The moral of this narrative is not that we should revert to barbarism, it is that we should become wholly civilised instead of half civilised. It is not necessary for us to herd together in hermetically sealed rooms and thus convey to each other our respiratory infections, neither is it necessary that we should live on a diet which is lacking in vitamins. What is needed is to secure a complete mastery of our environment rather than an incomplete and one-sided disturbance of existing conditions.

In acquiring a knowledge of diets human beings have advanced in a curiously irregular manner. When scientific methods were first applied to dietetics the chemists reigned supreme; weighing, measuring and chemical analysis were regarded as the proper means of study of food-stuffs and for a time we were asked to believe that a proper diet consisted of so many grammes of proteins, carbohydrates, fats, salts and water. If any one did not thrive on a diet which conformed to the rules of the chemists and physiologists of the day he was likely to be accused of having more than his fair share of original sin.

Yet even at the time when the formula for an ideal diet was laid down with confidence, it was well-known that a person might get scurvy in spite of the strictest compliance with the dietetic rules which were in force.

Rickets was also believed by many to be a dietetic disease, though there were great differences of opinion as to the nature of the dietetic defect.

Gowland Hopkins of Cambridge was the first to apply scientific methods to the study of what he called "accessory food factors," others followed his lead and made ambitious efforts to isolate these factors, assign to them chemical formulæ and give them names. Their work has proved to be of great value although their attempts to isolate the substances were failures, the formulæ which were assigned were wrong and the very name "vitamin" was a misnomer.

A vast amount of work has been done on vitamins during the past few years, three main

types have received universal recognition and several others are becoming more or less clearly defined.

Vitamines have suffered from over-popularity; they have become a fashion, even a craze. There has been too great a tendency to explain all sorts of diseases in terms of *vitamine deficiency*, but at the same time the part that is played by vitamins in nutrition is of supreme importance.

It is useful to summarise our knowledge of vitamins from the practical point of view.

(1) We know that a sufficiency of all the vitamins is necessary to the proper growth and health of every animal, including man. It is not quite clear whether there is any advantage to be gained from taking large quantities of vitamins; it would appear that there is a critical amount of each vitamin which constitutes what is necessary to secure perfect nutrition, but as no one has yet shown that harm is done by excess of vitamins it would appear to be wiser to err on the side of safety and to ensure a "luxus" supply in the diet.

(2) We know that a diet deficient in vitamin A will cause rickets, keratomalacia, osteomalacia, defective growth and lowered resistance to many diseases.

(3) We know that vitamin A is contained in large quantities in cod-liver oil, fresh butter, yolk of eggs and green vegetables. It is present in sufficient quantity in fresh milk.

(4) We know that lack of sunlight can cause essentially the same damage to the body as is produced by lack of vitamin A, and we have the curious experience that cod-liver oil will produce the same effects as sunlight in curing rickets.

"Bottled sunshine" has not yet been adopted as a name for a brand of cod-liver oil, but it would be more appropriate than most names of proprietary foods.

It is an interesting fact that modern science has satisfactorily settled the old dispute as to whether rickets was a dietetic disease or a disease of darkness and bad ventilation. Now it is known that both of these views were right.

(5) We know that a lack of vitamin B will cause polyneuritis in animals, including man. As in the case of the other deficiency disease, it is likely that far more cases of unrecognisable injury to health than of actual disease are caused by shortage of the vitamin.

It is likely that disease due to deficiency of vitamin B occurs in human beings; when well defined this disease is sure to be called "beriberi," though in the writer's opinion it is likely that two different diseases have been lumped together under the name beriberi.

One of these, and probably the less important, is a true vitamin deficiency disease; the other, which may have a better right to the name beriberi, is an intoxication by a poison which appears in rice under certain conditions.

In the present state of our knowledge those who wish to play for safety will recognise the possibility that two diseases have been called beriberi. By doing so they will be certain of success in preventing and treating these diseases.

Those who adhere blindly to the dogma of "beriberi a deficiency disease" will be liable to sacrifice the interests of their patients on the altar of their own obstinacy.

Vitamin B is plentiful in the seeds of leguminous plants like peas, beans, and lentils, also in whole-meal and egg-yolk. It is present in moderate quantities in fresh vegetables, fresh milk and under-milled rice.

It is scanty in over-milled rice, fine wheat flour, corn-flour, sago and many of the refined articles of food which are so often prescribed for invalids.

Deficiency of this vitamin should always be kept in mind as a danger to health when invalid diets are being prescribed. It is very unlikely that that actual polyneuritis will be produced, but low vitality, anæmia and gastro-intestinal derangement may well result from a serious shortage of this vitamin.

(6) We know that vitamin C is essential to health; a diet deficient in this vitamin will cause loss of energy, pains in the joints and limbs and eventually scurvy.

Minor and unrecognised forms of "avitaminosis C" are frequent in children and adults who are kept for long periods on invalid diets like over-boiled milk, corn-flour, sago and patent foods.

This vitamin is present in abundance in oranges, lemons, tomatoes, and in considerable quantities in most fresh fruits and vegetables.

Under normal conditions there is seldom any shortage of this vitamin in the diet, but numerous cases occur in which the doctor forgets to order a little orange juice or other source of vitamin C with invalid diets. The result of this neglect is delayed convalescence or even scurvy.

McCollum has shown that vitamin A is not the only fat-soluble vitamin; he applies the name vitamin A to the fat-soluble vitamin which specially promotes growth, and uses the name vitamin D for the factor which plays a part in the deposition of lime in the bones.

Professor Evans of California has indicated the existence of still another fat-soluble vitamin which plays an important part in promoting reproduction; he calls this vitamin E.

Probably we have not heard the last of the vitamins. New members of the family are likely to be brought to light, but we need not await their discovery with anxiety. What we know or ought to know about diets from a practical point of view is enough to ensure that we shall have a sufficient supply of all the vitamins, whether known or unknown.

J. W. D. M.

Current Topics.

Osteomalacia in Kashmir.

By KATHLEEN VAUGHAN, M.B. (Lond.),
Late Superintendent, Zenana Hospital, Srinagar.
British Med. Jour., March 6, 1926.

THIS is a valuable contribution to our knowledge of this very important disease, and we have therefore made liberal extracts.

Osteomalacia is extremely common in Kashmir. In Srinagar out of 29 Cæsarean sections performed during one year there were at least twenty-five due to pelvic deformity caused by osteomalacia. The number of Cæsarean operations increases yearly in Srinagar as the women gain confidence in the hospitals.

Almost all Kashmiri women who have borne children are affected in some degree, with the exception of the *manji* (boatman) class. These women live in the open air on the large boats used for carrying rice, wood, etc.

They work hard, and feed with the men. They are too poor to cook their food much, and eat raw cucumbers, tomatoes, etc., with their rice, which they husk by hand. They pole and paddle the boats like the men, and are out in all weathers. Their milk supply is provided by their goat or cow, and one may be fairly certain it is not boiled, but consumed as soon as drawn. The disease is unknown among men in any part of the world, and Kashmir is no exception.

The ordinary Kashmiri woman who lives on land, especially the city dwellers, have the disease—sometimes slightly, when there is tenderness of the pelvic bones and the antero-posterior curve of the sacrum is exaggerated, or so acutely that the sufferers can only crawl by means of their arms and legs, the legs being flexed at the knees and the knees drawn up to the shoulders. The worst cases are seen in the houses of the wealthy, who keep their women in seclusion, and among those of the poorer classes who do the same.

There is a marked seasonal incidence; the disease is worse in winter and early spring, during and after confinement to the house in the cold weather, and improves markedly during summer and autumn. A common history is that of confinement to the house at 8 or 9 years of age, marriage at 10 or 11, menstruation at 12 or 13, and close confinement in the husband's house until after the first child is born; in the most high-class families the women hardly leave the house till they die. The ordinary woman has more freedom, and when she has borne two or three children she goes out with other women.

Anæmia and debility characterise pregnancy, with vague pains in the ribs, back, and legs, increasing until walking is difficult or impossible at term. The earliest pains complained of are in the lower ribs, about the centre of the bone, and tenderness on vaginal examination may be the first complaint to arouse suspicion of the disease; the pain on pressure is found to be at some spot on the bony wall, not at the symphysis. Backache is a constant complaint, as it is with many pregnant women, but the typical pelvic deformity eventually produced in an acute case which has been going on for years is the tri-radiate pelvis, the pubic bones being pressed together and giving the familiar rostrated appearance—the acetabula pressed in towards one another, the sacrum tilted forward, and the coccyx bent forward; the sacral curve is then more concave than normal, and the fœtus at full term may rest on a bony shelf formed by the crumpled-up bones of the maternal pelvis.

In a few cases it was difficult, if not impossible, to reach the os or rupture the membranes; in others the pubic rami were so close together that a finger could with difficulty be inserted sideways. Tetany is a common accompaniment of osteomalacia; women are brought to the hospital with their thumbs flexed in the palms of their hands and the whole hand flexed at the wrist.

It is not a hysterical manifestation, as experience shows its close connexion with osteomalacia and probably with thyroid and parathyroid deficiency. In many of these cases the thyroid is smaller than normal, and the neck seems wasted on inspection.

There may be improvement after confinement, and when lactation ceases. Lactation only ceases when the child dies, otherwise it is continued for from two to four years, and the osteomalacia becomes more acute when the woman again becomes pregnant. Many when pregnant are suckling one or two previous children.

The acute pains are usually better after delivery, but recur in the second and later pregnancies. The third confinement results in more crippling, and by the fifth month the patient cannot sit or stand or walk without severe pain.

Many suffer from phthisis and tuberculous glands, and many of the men of the families in which there is osteomalacia suffer from tuberculosis. It is too constant a relationship to be mere chance.

Anæmia is always present, and unfortunately is admired, as a fair complexion is considered a sign of being well bred.

The pale hue so much sought after is increased by the seclusion of the women, not only from the outside world but from sun and air. The better-class women when they go out wear, from the age of 10, a "burka"—a cloak covering the head and body, with two lattice-work holes for the eyes.

Some apparently impossible midwifery cases terminate spontaneously after several days in labour—provided, the deformity is not such as to prevent the head engaging in the superior strait of the pelvis; the pressure of the head may be sufficient to make the softened bones yield, but as the woman gets older the bones ossify in faulty positions and the crumpled pelvis becomes unyielding.

Many deaths take place in childbirth owing to conditions consequent upon osteomalacia, and as skilled assistance is not available mother and child are often lost. The native midwife, who has no training but tradition, performs a rough craniotomy with the sharp end of a spindle, removes the infant's brains, places a loop of string round the neck, and extracts it. In a difficult case she may pierce the mother's uterus, and the mother frequently dies of septicæmia. A native midwife will "clean" her hands before making an examination by rubbing them on the mud floor. She frequently completes her attentions to the patient by rubbing salt or mustard oil into the lacerated vagina. Atresia of the vagina caused by such measures is fairly common. A natural cure of the pains and softness of the bones occurs at the menopause.

One of the most remarkable things where Cæsarean section is done for these women is the size and healthiness of the child. The women are thin, anæmic, and deformed; their offspring at birth are often extremely fine, healthy, heavy specimens, and later show no sign of rickets.

There are three indigenous Kashmiri cures for "trouble in the bones": (1) a special clay called Baramulla earth; (2) pills made of fish liver; (3) rubbing with mustard oil and exposing to sunlight.

1. Baramulla earth is a greyish-white fire-clay. A lump of this earth taken from a patient with osteomalacia, who ate pieces of it, was analysed by the Clinical Research Association, which reported that it was a ferruginous clay containing a fairly high percentage of calcium phosphate (calcium phosphate 16.2 per cent.; ferric oxide 11.8 per cent.).

2. The fish-liver pills are sold by a Panditani (Hindu woman) living at the city fish market. She makes them herself. The analogy with cod-liver oil is interesting.

3. The mustard oil and sunlight cure is chiefly used by the men for their rheumatic pains.

Diet.

The richer classes cook all their food. The milk is boiled and reboiled. The city dwellers who keep their own cows have them in dark stables or in the courtyard and send them out daily to graze. In some cases

they are fed on dry food and rarely go out. Sheep and goat's milk is used, generally when prescribed as medicine by the Kashmiri practitioner. Vegetable oil, either mustard or sesamum, is used for cooking. The oil is heated to boiling point first. The women eat no raw vegetable or fruit; they think anything uncooked unwholesome, and in a place decimated by cholera every few years it probably is. The rich eat rice husked by machinery, which removes the pink pericarp and the germ. The bran which is thus produced is given to the cattle, and is, of course, rich in phosphates. The women eat after the men, and therefore get less meat and milk, both considered luxuries, but otherwise their diet is the same as that of their menfolk.

Social Customs.

Purdah varies in strictness, and is much less strict in Kashmir than in India. In Kashmir it really only affects the women of marriageable and child-bearing age. Among the better classes they are more or less confined to the house.

Marriage takes place before puberty in many cases, because in order to ensure early marriage the younger the bride the less are the fees to the priests. One of the greatest sins a father can commit is not to have his daughter married at puberty. After marriage she is confined to her husband's house, and her food depends entirely upon her mother-in-law, who often keeps her short of food, from an idea that she will have an easier confinement if the foetus is kept small by spare diet. It has been pointed out by other observers that much tuberculosis originates in these girls during the first year of married life owing to these miserable conditions.

At childbirth the woman is confined in a dark unventilated room, often with no window at all, no fireplace, but a charcoal brazier or the fire basket. Forty days is not an uncommon time for the young mother to be in this unventilated place, and she emerges weak and ill. Osteomalacia usually begins with the first pregnancy or soon after marriage.

The streets of Srinagar leading from the river are narrow and tortuous, and the houses, which are of wood, are high and built round small courtyards, where in the winter the sun never shines. Nor does it reach the ground of many of the streets where the aspect faces north.

The women go out in the winter as little as possible. They live in the lowest rooms of the high wooden houses in the winter, so as to be on the same floor as the water supply and the fire. The ground floor is the warmest. The windows are sometimes less than half a yard square, and protected against thieves by being near the ceiling and closed by wooden lattice-work. In winter they are covered with oiled paper to keep out the cold. The minimum of available light is thus admitted, and some rooms, specially liked for warmth, have no windows at all.

Sunlight alone can cure the disease, and cod-liver oil without sunshine is of very little use. The seasonal incidence above described points to the same cause—absence of sunlight. In spring and summer the women go out and improve in health. The disease only occurs in those deprived of sunlight, and one meets women walking about who have evidently had the disease, and who will tell you they were shut up as young women, but on the death of the husband were free to go out.

Reports from places in India where cases of osteomalacia occur indicate lack of sunlight as the cause.

At Peshawar among the Afghan women, who go out freely and live an open-air life, none were known; the only cases reported were in Hindu shopkeepers' wives, who married young and were kept in purdah. In Lahore the disease is uncommon; the worst cases occur among those who seclude their women and are rich enough to have glass windows, sometimes made so that they cannot be opened.

The most instructive notes come from Bombay, where the Parsee women are completely free from it, and yet the women of the weaver class have it, and

were they not recruited from the outside country villages would die out in a generation. A Parsee doctor states that out of 25,000 deliveries he did not encounter one case of osteomalacia among Parsees. They have great freedom, and do not marry until about 20 or 22. The weaver class, on the other hand, living in the same town are almost all affected. The superintendent of the Cama hospital states that they suspect osteomalacia in every weaver woman coming for her confinement. These women live in buildings eight stories high. The loom is on the ground floor in the room facing the street, because all available light is needed for the work, and the women live in dark rooms behind that; the mortality rate is 678 per 1,000 infants under 1 year.

Antepartum Accidental Hæmorrhage.

The Lancet, 20th March, 1926.

At a meeting of the Section of Obstetrics and Gynecology of the Royal Society of Medicine on March 4th, 1926, Dr. Gibbon FitzGibbon claimed that the frequent recourse to operative measures which was usual to-day in cases of accidental hæmorrhage during pregnancy, did not give as good results as more conservative and expectant methods.

He defined some of the points in the generally accepted views of accidental hæmorrhage which he found incompatible with his clinical observations. The division into revealed and concealed hæmorrhage did not group the cases in any way connected with the gravity of the symptoms or the origin of the hæmorrhage. He accepted the opinion that the condition was due to a toxæmia and considered this supported by his clinical observations, but the toxæmia was either not the same as that associated with eclampsia, or else it had some fundamental modifying character. He considered that it arose from renal insufficiency and was a complication that arose during pregnancy in a subject of chronic nephritis. The various treatments adopted and practised with the object of controlling active hæmorrhage had not justified themselves by their results, because the bleeding was never really active or rapid in the serious cases, since it was due to a slow extravasation of blood from the whole uterine interstitial tissues, while in those relatively rare cases primarily due to ablation of the placenta the hæmorrhage, although sharp for a time, rapidly ceased by the normal process of coagulation and closure of the maternal placental sinuses and never gave rise to systemic symptoms. Antepartum accidental hæmorrhage must be divided into two types—a simple type truly accidental and due to ablation of the placenta, and a serious type due to toxæmia and interstitial degeneration of the whole uterine tissue without damage to the muscular elements. This type was better described as hæmatoma of the uterine walls, or uterine apoplexy. The symptoms were due to a slow progressive loss of blood, and the acute symptoms developed when that loss of blood had exceeded the physiological limits of vasomotor compensation, or when the onset of active labour added a greater strain than the depleted system could support. This latter was the common termination and required restoration from the condition of collapse; it was then usually followed by a rapid spontaneous termination of the pregnancy by the natural forces. The treatment and results from the treatment in two groups of cases treated in the Rotunda Hospital during consecutive periods of nine and six years respectively were compared, as well as the pathological conditions found associated with the complication at operations and autopsies and reported by other observers, the general characteristics being almost universally the same. Active treatment to control the hæmorrhage was never required, but rather the restoration of the collapsed circulation. This was best obtained by the most conservative methods, after which the pregnancy could be terminated slowly by induction of labour in those cases which did not terminate spontaneously as a result of the complication, and which were not due to a purely

accidental hæmorrhage as distinct from the diseased condition due to a toxæmic degeneration of tissues. The very serious cases commonly considered only amenable to operative treatment, such as hysterectomy, were not capable of standing the additional strain of such an operation, while those that recovered after operation would have been all the more easily treated for the collapse and would then have been suitable for simpler methods of terminating the pregnancy, if it had not ended spontaneously."

The Tai Foong Chee Treatment of Leprosy.

Proceedings Royal Soc. of Med., Feb., 1926.

Section of Trop. Dis. & Parasitology, p. 1.

DR. TRAVERS of Kuala Lumpur read a paper on this subject at a meeting of the Royal Society of Medicine in December last. The treatment was carried out at the Leper Asylum near Kuala Lumpur. In 1922 neosalvarsan and tartar emetic were tried but no appreciable benefit followed. The ethyl ester treatment after the prescription of Dr. Muir was then tried in 40 patients and about 50 per cent. of the patients improved, but the treatment was regarded as being painful. It was found that nine Chinese lepers had improved remarkably on a treatment of their own: this consisted of a powder made up of *Hydnocarpus anthelmintica* (Tai Foong Chee) 2 parts, *Tribulus terrestris* and *Cannabis indica* one part each. Dr. Travers decided to try the treatment first of all after the original prescription, then with the omission of the *Tribulus terrestris* seeds and an increase in the proportion of the *hydnocarpus* seeds in the proportion of three parts to one of the *Cannabis indica*. Selected nuts are used and they are powdered in a mortar. The dose is half a drachm twice daily after food.

The results in 275 cases were remarkably good. More than 80 per cent. of the cases which were under treatment for more than two years showed improvement, and of those examined after two years because visible signs of the disease had disappeared over 50 per cent. were found to be negative bacteriologically. The asylum now has 500 lepers most of whom came voluntarily for treatment at an early stage. The whole staff consists of lepers, who carry on the whole work of the colony. Work, games and amusements are prominent features of life in the asylum. The cost of the treatment is about two annas a-head monthly. The treatment is pleasant and easy to carry out; reactions are common, if not severe they are followed by improvement.

The Functions of the Spleen.

The Lancet, 20th March, 1926, p. 608.

A RECENT editorial in the *Lancet* on this subject will be of special interest to our readers. It summarises the results of recent research:—

"Removal of the spleen does not produce any very disastrous results. The animal may be rather anæmic, it may have a diminished capacity of producing antibodies, it will be less resistant to enteric infection and more resistant to tuberculosis, it may be jaundiced less readily by hæmolytic poisons, it may perhaps develop a voracious appetite; and a good many other things may happen according to some observers, while according to others they may not. In any case, no change regularly follows splenectomy which has any great influence on the vitality or morbidity of experimental animals. It does not follow that man is equally indifferent; his standard is higher and he is more carefully observed, and in much larger numbers. But there must be a good many spleenless individuals in the world, and no definite asplenic syndrome has been identified as an illness. As an article of faith we must believe that if the spleen did nothing, it would not be there. In other words, the spleen is useful but not necessary. What is known of its functions is summarised by Dr. E. B. Krumbhaar in *Physiological*

Reviews (1926, vi, 160), and his copious bibliography will enable anyone to follow the ramifications of any of the hypotheses or results of observation.

Last week we were able to publish some of the most recent progress which has been made by Prof. Joseph Barcroft and his colleagues at Cambridge. His lecture at Leeds is a supplement to one which he gave at Manchester some years ago, published in *The Lancet* at the time (1925, i., 319). He deals with two main functions—the spleen as a reservoir of blood and its action in altering the resistance of red blood corpuscles. By fixing metal clips round the edges of the organ and x-raying the animals, or by watching it through a celluloid window in the abdominal wall, Prof. Barcroft establishes that the spleen in a normal animal at rest is a good deal—two to perhaps four times—bigger than it is after death, and that our ordinary ideas of its actual size *in vivo* are by this amount in error. The excess of the living over the dead size is blood or red corpuscles, or something between the two. Hæmorrhage stimulates the spleen to expel this excess into the circulatory blood and the amount expelled is roughly proportional to the severity of the hæmorrhage. Exercise has a similar effect, and the possibility of adding fresh hæmoglobin to the circulating blood may help an animal to withstand CO poisoning. The spleen, therefore, functions as a reservoir of spare blood which can be emptied into the general circulation when desirable. Quantitatively it is not a large tank. The dead weight of the human spleen is about 0.25 per cent. of the body-weight, its live weight one supposes may be 0.75 per cent.; it can, therefore, add 0.5 per cent. to the blood, which constitutes some 5 per cent. of the body-weight. Making allowance for the fact that the mixture discharged from the spleen is more concentrated than blood, we may conclude that the reservoir is able to increase the circulating red corpuscles by some 12 or 15 per cent.—a useful thing to do, but not necessary to life, though it may well be just enough sometimes to turn the scale in favour of survival. As Gross has shown, the human spleen goes through a regular series of age changes which leave it a fibrous and apparently rather functionless organ in middle life and later, and this is, perhaps, one of the explanations of its characteristic failure to achieve useful but unnecessary activities involved by age. On this and other points Prof. Barcroft will awaken attention, and he has enabled us to look at the spleen and its vagaries in the post-mortem room with new ideas of interpretation in our minds. And if Henry Gray had not died of small-pox at the age of 34 he might have secured that his essay (*On the Structure and Use of the Spleen*), which won the Astley Cooper prize in 1853, should be as familiar as the *Descriptive and Surgical Anatomy* of 1858. We should, then, as Prof. Barcroft points out, have known the essentials of all this without being told, for Gray clearly states the main point and, indeed, might with a good deal of luck have just been able to rise in Prof. Barcroft's audience and state it again.

The other topic with which Prof. Barcroft dealt in his recent lecture is the resistance of red cells to hypotonic saline. The red cells coming out of the spleen are less resistant than those going in; if the spleen is made to empty itself out by stimulating the splanchnic, the red cells which come in as it is allowed to refill acquire their increased fragility almost at once. What this means we do not know. Especially we need to find out how much blood passes through the spleen per hour, whether any red cell goes into the spleen more than once, and hence whether this acquired fragility is lost again in the general circulation. But we can add to these facts the human experience that splenectomy alleviates congenital acholuric jaundice and raises the resistance of the fragile red cells which are characteristic of that disease, and that it cures splenic anæmia. Perhaps we have at last an explanation of the puzzling variety, described by Prof. E. H. Kettle and others, of the anatomical changes in the large spleen removed so successfully in this condition; any hypertrophy of the splenic tissue may diminish the resistance of so many

cells or diminish it so much that actual anæmia results, irrespective of the original cause of the splenic enlargement. Add, too, that splenectomy inhibits the production of jaundice by arseniuretted hydrogen and of anæmia by phenylhydrazine and perhaps also, in view of the possible relationship between red cells and blood platelets, that it can cure purpura. All of which adds up to the summary conclusion that the spleen does something to red cells which makes them more easily destroyed. Whether this mechanism is one of emergency or in constant use remains to be discovered. The spleen is no doubt sometimes useful; it is evidently not necessary; medicine supplies us with illustrations of how it may be harmful."

A New Conception of the Thyroid Gland.

British Med. Jl., April 3rd, 1926, p. 624.

COMMENTING upon a paper on "The Applied Anatomy and Physiology of the Thyroid Apparatus" which appeared in the *British Journal of Surgery*, 1926, Vol. XIII, the editor writes as follows:—

Nothing could have been more simple than the structural conception of the thyroid gland imparted to students by teachers of a former generation. It was made up of minute vesicles, each about one-hundredth of an inch in diameter, lined with a cubical epithelium, and filled with a colloid secretion. The conception of the thyroid now being taught by Dr. G. Scott Williamson, and supported by an array of observations drawn from glands in all stages of growth and in all states of activity, is that it is made up, like the liver, of an enormous number of minute units or lobules, each about one-twenty-fifth of an inch in diameter. But whereas each hepatic lobule is embedded within a venous or blood sinusoid, the thyroid lobule lies within a lymph space or sinusoid. The thyroid gland is thus planted on the lymph system, a relationship which Mr. R. H. Burne has demonstrated in the anatomy of the angler fish. Each lobule or unit of the thyroid has its own hilum, its own delicate capsule, lined by lymphatic endothelium. Each lobule, during its active phase, has its thyroid epithelium arranged in convoluted cylinders; the cells of each cylinder are grouped round a lumen, and are surrounded by capillaries and enclosed by a covering of lymphatic endothelium. The output of a lobule in the phase of active secretion appears within the lumen of the cylinder, and Dr. Williamson is convinced that he has traced its passage into the lymph space surrounding the cylinder, and that it is through the lymph system that the secretion, which in the active phase is clear and watery, passes out into the general circulation of the body.

Such is Dr. Williamson's picture of a lobule or gland unit in a state of activity—a state which may be seen throughout the gland at birth, in the years of adolescence, in pregnancy, and in Grave's disease. In some stages of growth, as in children under the age of 5, most of the lobules or gland units pursue another form of activity. A colloidal substance, which Dr. Williamson regards as altogether different in nature from the clear secretion of the active phase, collects in the lumina of the cylinders; the cylinders become broken up, and produce the vesicles with which all are familiar. No new light is thrown on the manner in which the colloid content of the vesicles is formed; apparently it passes into the blood capillaries which surround the vesicles, and thus is carried by the blood to the tissues of the body. Dr. Williamson presumes that the vesicles may become abnormally distended, either through a too rapid formation of colloid or by a failure in the rate of its absorption. The mechanism which causes one lobule to pass into a state of active secretion while a neighbouring lobule applies itself to the storage of colloid is not known; but Dr. Williamson is of opinion that the tissues of the body have some means of making their wants known to the thyroid and of evoking a direct response from it. However this may be, the solid fact remains that in endemic goitre of the vesicular type—where colloid storage has been carried to an excess—iodine

medication is effective, whereas in the hyperplastic or secretory types of goitre, as in secondary Grave's disease, iodine medication is useless or even injurious. Also another result emerges—namely, that when we have to interpret the pathological appearances presented by the thyroid gland we obtain no guidance from the old teaching of thyroid structure, whereas Dr. Williamson's observations give us the key to a rational interpretation.

In drawing inferences as to a direct functional relationship of the thyroid to the parathyroids, and of both to the thymus, Dr. Williamson enters a field of bold speculation, and yet one which is justified in the present state of our knowledge. The lymphatic systems of the thyroid and thymus are certainly in close union; thyroid and thymus have a similar origin in the embryo, and it may be that the endothelial cells of the thymus store and disseminate substances formed by the epithelium of the thyroid. Much has to be done before such speculations can be seriously entertained. But of this we may rest assured: the method of inquiry pursued by Dr. Williamson has much to commend it. He has broken down the barriers that lie between anatomist, physiologist, and pathologist. In his inquiry into the disorders of the thyroid he has played the triple part of anatomist, physiologist, and pathologist, and each department of his inquiry has helped the other. His research is one of the many benefits which have flowed to medicine through the wise encouragement and support of the Medical Research Council.

The normal Temperature of Man with Illustrations of its Derangement.

By MR. J. B. BLAICKLEY.

(*Guy's Hospital Gazette*, March 27, 1926, p. 163).

A CONSTANT temperature is a matter of great importance to man. It places him in a position very largely independent of that of his surroundings, so that each tissue of the body may function in a constant medium; for, with an unchanging internal temperature the maintenance of the normal chemical activities of the body is made possible. Further, each organ and system of the body has been enabled to become more delicately specialised and finely adjusted to its function. Presumably the various units of the body, in the long process of evolution, by interaction on one another, have produced a normal temperature for man of 98.4°F. or thereabouts, and have made it their optimum.

An adult man, if kept quietly in bed, produces on an average 1,800 calories in 24 hours; of these only 660 are due to activity of the heart, respiratory muscles, liver and kidney, leaving over 1,000 calories which must be produced by the tonic contraction of the skeletal muscles; these, even at rest, form, therefore, the most important factor in heat production, while in activity this rises tremendously, to ten times or more of that at rest. It is interesting on regarding the muscular system as a mechanical engine to realise that it is not more than 30 per cent. efficient (a locomotive is little more than 10 per cent.); only 30 per cent. of the potential energy supplied is converted into muscular work, the remaining 70 per cent. appearing as heat. If the muscular innervation of a limb be destroyed, either by section of the nerves or the action of curare, the tone of the muscles is abolished, and the limb falls in temperature, reacting to that of its surroundings somewhat as a cold-blooded animal does. In the cases of men with traumatic lesions high up in the cord, it may be found that the whole body is unable to cope with its heat loss by even the increased production of heat in its upper part, and so the temperature falls. This illustrates the importance of the muscles in the production of heat. Incidentally it has been shown that muscular tissue is warmer than the pervading blood. From the muscles the blood stream distributes the heat over the rest of the body, though the extremities differ in temperature from the greater bulk of the body.

On Prof. Pembrey's suggestion, the author carried out a few observations on himself, and the first he

mentions here, since it shows the important effect of muscular work. He went for a half-hour run one morning and found that whereas his temperature as shown by the rectum was 99.2°F. before, it rose to 102.7°F. after the exercise, which was by no means excessive, his pulse being 120 or so, breathing comfortable, and sweating only gentle. It must be noted that it was raining slightly. This observation will perhaps surprise many and it must be admitted that the effect of muscular work on the temperature seems to be rather overlooked.

When the temperature of the air rises above 70°F. or so, the heat production rises as the result of a passive increase in the chemical activities of the body. Thus an extra strain is thrown on the heat loss mechanism.

Even apart from the choice of suitable clothing, man shows a greater range of accommodation in heat production and heat loss than any other living animal. Warm clothing increases his power of resistance to cold conditions, but it is unfortunate that he seldom wears clothing suitable for hot weather. Clothes fitting closely round the neck and wrists prevent a good circulation of air over the skin and so evaporation from the body is reduced to a minimum.

As already indicated, the conditions of the surrounding atmosphere play a very important part in their effect in the heat loss mechanism. As everyone knows, a high atmospheric temperature alone produces no great discomfort to a man engaged in muscular work, but if this be coupled with a high degree of saturation and an absence of wind, physical exercise is not only distasteful, but uncomfortable, while the muscles show a loss of tone, which results in a decreased heat production.

Hot, moist climates have a depressing effect, extreme cold is also incompatible with great activity and development; both produce lethargic temperaments. A variable climate keeps the body ever reacting to change, and provides a stimulus which results in great activity of mind and body.

The disordered condition of temperature control known as "heat-stroke" is of great interest and practical importance. Other names are sunstroke and heat-apoplexy. When bacteriology first came into prominence, an attempt was made to class heat-stroke as of "germ" origin, but this belief is now wholly discarded.

The condition is most prevalent among men exposed to the effects of muscular work under the influence of a high temperature, and especially among those unsuitably clothed for such conditions. As would be expected the Indian Army suffers considerably from heat-stroke. Farm labourers, even though they work all day in the full glare of the sun, seldom suffer from this disability. They clothe lightly and sweat copiously; the latter is possible owing to the large amount of water they drink. It takes time for the water taken to replace that sweated from the subcutaneous tissues, and therefore it is advisable to drink often and freely. The belief that a man when over-heated should not drink cold water is physiologically unsound, and it is yet to be shown that anyone has suffered ill-effects from doing so.

Heat-stroke results from the failure of the heat loss mechanism to keep pace with the heat production, and the temperature rises to an alarming degree, damaging the central nervous system, enfeebling its control of the body and also damaging the heart, causing a poorer circulation and still less efficient heat loss through the skin. Both effects only aggravate the condition. Sweating may continue, but often owing to the disturbance of the nervous system, the sweat glands fail to secrete and the patient suffers from a dry burning skin. Later he becomes very sick and delirious and the pupils of the eyes become contracted.

The most effective treatment consists in giving a persistent cold douche, as from a hose, which gradually lowers the temperature. Often the cutaneous circulation is at a standstill owing to cardiac failure; in such cases rapid relief may be afforded by iced drinks and iced enemata. Owing to the partial paralysis of the nervous system, the body reacts much as a cold-blooded animal's does, varying in temperature with that of its surround-

ings. Cold water no longer results in increased production of heat. Antipyretic drugs are without avail.

In some people, the heart fails early on, before there is any great rise in temperature. The resulting deficient circulation causes an accumulation of waste products in the tissues, diminishing their activity, and the patients exhibit subnormal temperatures and profuse sweating.

Victims are commonest among soldiers, and less so among the populations of such towns as New York. There the high buildings prevent any breeze from the country and act as traps for the accumulated sweat and damp arising from the city.

Theory and Practice in Relation to the Treatment of Cancer with Lead.

By W. BLAIR BELL, B.S., M.D. (Lond.), Hon. F.A.C.S.,
British Med. Jour., April, 17, 1926, p. 687.

AN address to the Medical Society of London in opening a discussion on the treatment of cancer by lead was delivered by Professor Blair Bell. The malignant neoplasma appears to be a reversion of the somatic cell to the early embryonic type which forms the trophoblast. The chorionic epithelium can be regarded as being a normally malignant tissue which comes under the somatic control. It is malignant in that it is dependent on its own efforts to obtain nourishment for itself and, indirectly for the growing embryo. There does not seem to be any reason why, if a cell is capable of passing through all the stages of undifferentiation in order to become the differentiated cell with special functions as seen in the human embryo, under certain circumstances it should not retrace its stages and again become undifferentiated. This process of differentiation has been shown to occur in the case of normal differentiated cells when grown *in vitro*. This dedifferentiation may be brought about by many causes, mechanical, bacteriological, radiological and so forth. The evidence in support of this hypothesis can be considered under a number of headings.

Morphological Evidence.

The histological evidence of structure and mode of progression of malignant cells very strongly supports the view that these cells are of a dedifferentiated type, and that this dedifferentiation of the cell is comparable with its degree of malignancy. Moreover, that in malignant neoplasia there is a tendency to syncytial arrangement on the part of the cells. Pathologists must often have noticed how true this is, not only in carcinoma, but also in sarcoma.

Again, while it is evident, that in malignant cells developed from somatic tissues there is some degree of dedifferentiation, not only towards an earlier stage of development in the tissue concerned, but also towards the totally undifferentiated chorionic epithelium, yet there is an exception to this dedifferentiation in the development of malignant neoplasia in the case of chorion-epithelioma, which reproduces normal chorionic epithelium. In short, whereas benign neoplasia is the result of hyperplasia in normal tissues, malignant neoplasia is a process of dedifferentiation except in the case of chorion-epithelioma which represents hyperplasia of a normally malignant tissue—the chorionic epithelium.

Constitutional Evidence.

Chemical Constitution.—Although there are related secondary chemical differences between malignant cells and normal resting tissues, it is the lipid content, especially that of the phosphatides, and the phosphatide-cholesterol ratio that are interesting, for these substances are of primary importance in the constitution of the cell. Professor W. C. McC. Lewis, Dr. J. W. Corran, and Dr. M. Jowett have found that the phosphatide content and the phosphatide-cholesterol ratio are much higher in malignant than in normal tissues and benign tumours, and that these figures reach a maximum in the constitution of the chorionic epithelium (Table I). Further work is being done in this important subject.

Physico-chemical State.—With regard to the physico-chemical state of the cell membrane, it is obvious that permeability is a matter of prime importance; for, if a cell be in urgent need of nutriment, permeability may be a deciding factor in the continuance of vitality, as indeed it is an absolute requisite for rapid growth. Now it is interesting that the degree of permeability of the cell membrane is dependent on the phosphatide-cholesterol ratio: a high cholesterol content favours impermeability, whereas a low cholesterol content and a high phosphatide favour permeability, for this ratio is consistent with an oil in water type of emulsion.

TABLE I.

Human Tissues Examined.	Water (per cent.)	Phosphatides (per cent. of dry weight).	Phosphatide-cholesterol ratio.
Normal tissues ..	75.3	2.1	2.5
Innocent neoplasms ..	(80.9)	(1.5)	(2.8)
Malignant neoplasms..	81.5	4.1	3.9
Chorionic villi ..	89.9	6.8	4.7

Physiological Evidence.

Many attempts have been made to discover differences between the metabolism of the malignant and that of the normal resting cell; but until recently little of importance had been established. Two years ago, however, Professor Warburg of Berlin commenced to publish a series of most valuable papers on the glucolytic power of various tissues. The chief conclusion derived from his most ingenious experiments is that, whereas in normal resting tissues respiration is high and energy is produced exclusively by oxidation process, malignant tissues have a lower respiration, and obtain a considerable proportion of their energy by glycolysis. Moreover, Warburg has shown that although a normal resting cell has a slight glucolytic power in the absence of oxygen, in aerobic conditions it does not perform glycolysis; malignant tissue, however, exerts its glucolytic power even in the presence of oxygen. So definite is Warburg's work on this main line that it is unlikely ever to be upset by subsequent researches; indeed, it has already been fully confirmed by Murphy and Hawkins of the Rockefeller Institute, New York, and by others.

Certain other investigations have naturally followed. Warburg has stated that benign tumours lie between malignant and resting tissues in regard to their glucolytic power. It is unfortunate, however, that this investigator should have chosen papilloma of the bladder as a representative of an innocent neoplasm, and there is little doubt that considerable difference would be found in the glucolytic power of this tumour and that of, say, a fibroma. This is a matter that is easily settled, and it in no way affects Warburg's general conclusion.

What has, however, interested the author is the question of the position of the chorionic epithelium in respect of this function. Warburg himself states that the anaerobic glucolytic ability of this tissue is even greater than that of malignant tissues, but that it does not perform glycolysis aerobically. There is no doubt that his work in regard to the chorion is open to the possibility of experimental error, in that he examined this structure after removal from the uterus with very young rat embryos, and may, therefore, have left much of the chorionic epithelium in the uterus. Murphy and Hawkins appear to have investigated this matter a little more definitely, for they chose the placenta of rats at about half-term. Figures given by them do not express quite such a high glucolytic power as that obtained in the case of the Flexner-Jobling tumour, but in this case one may make the criticism that the chorionic epithelium at mid-term has ceased to perform its true malignant activities, and therefore would record a lower figure than at an earlier stage of development. However, these workers commit themselves to the definite statement that, as regards the placenta, the type of metabolism is exactly the same in respect of glycolysis as

that of frankly malignant tissue (Table II). The author has little doubt that when even more careful

TABLE II.

Glucolytic Power of Normal Resting Tissues, and of Innocent and Malignant Tissues.

	Respiration.	Anaerobic Glucolysis.	Aerobic Glucolysis.	Ratio Aerobic Glucolysis-Respiration.
Normal resting tissues.	++	+	—	—
Differentiating embryonic tissues.	++	++	—	—
Benign neoplasms	+	+	+	+
Malignant neoplasms.	+	++	++	++
Chorionic villi ..	+	+++	++	++

experimental work is done on the subject this statement will be amply confirmed. Meanwhile, although so far the evidence obtained is confirmatory concerning the essential similarity of the chorionic epithelium and malignant neoplasia, a final decision in regard to the glucolytic power of the different tissues awaits further experimental demonstration. Professor Lewis and his associates are now engaged on this work.

Toxicological Evidence.

Although it goes without saying that the toxicological affinities of a cell must be closely bound up with its chemistry and physical state, it is necessary from a practical point of view that the resemblance in this respect between malignant and chorionic tissues should be made manifest; for, obviously, this is the information on which one has based one's methods in the medical treatment of cancer. The chorionic epithelium is singularly sensitive to the action of lead, and it is possible readily to produce coagulation necrosis of the epithelium of the chorion in the rabbit. Lead appears to have the same action on the cells of a malignant neoplasm when it is able to reach them immediately and in sufficient quantity. When the effect is gradual fibrosis occurs around the atrophic inactive cancer cells, this being almost a natural form of cure.

Reference need hardly again be made to the obvious inference that the biological hormone that arrests the invasive powers of the chorionic epithelium in normal circumstances should also have a similar effect on malignant neoplasia; but we ourselves have, so far, been unable to identify this substance. If the hypothesis be correct, and have reached the stage of generalization, there is plenty of work for others along this line; and, indeed, it is not impossible that other inorganic and organic substances may be found that will exert the same effect as lead.

It would appear that sufferers with lead poisoning—who, if males, may be infertile and, if women, may abort during pregnancy—do not suffer with cancer. It is not impossible; but there appears to be no doubt that carefully corrected statistics do suggest that the two diseases are not compatible.

Treatment.—An impossible position has arisen with regard to the treatment of cancer. The public and a large section of the medical profession for some time have been talking of the search for a treatment for cancer. The idea in their minds appears to be that one day a great discovery will be made and immediately all forms of cancer will become curable. One moment's consideration will make anybody who is familiar with the problem realise the futility of such an idea. It is obvious that the earlier the growth is taken in hand the easier will be the work of the specific. The difficulty that will confront us will be the early diagnosis of malignant growths, or rather of the existence of malignant cells in the body. The only solution will be the

introduction of some simple test to show the presence of these cells.

No method of treatment can be appraised by comparison with an ideal—always impossible of attainment—but rather by properly standardised comparison with other methods of treatment, and it is by this latter method that results should be judged. By "standardised comparison" methods of treatment in exactly similar cases and circumstances must be compared. A new method is handicapped from the start: the successful treatment of hopeless cases, in which all other methods have failed, is demanded; and if this result be accomplished the method is not accorded the credit due to it. Still, a method of treatment should be given the chance of starting on the same mark as other methods that are in vogue, including surgery.

Moreover, an initial attempt to treat patients by a method based on a generalisation must not be too closely regarded as a test of that method. The author has looked upon the results obtained so far with critical eyes, and has considered the beneficial effects of lead upon malignant growths as important, chiefly because they afford confirmatory evidence of the correctness of his views. It would indeed be ridiculous to expect any method in the treatment of cancer to bridge over the enormous clinical difficulties at the first attempt.

It is, however, fortunate that the application of theory to practice has at one step given fairly satisfactory results; yet there is danger in this. There is no doubt that any preparation of lead may give certain results, and that eventually one preparation will be found to exhibit more definitely than others specific toxic effects in regard to malignant neoplasia, and less towards normal resting tissues. Still there is no doubt concerning the possibility of further modification and improvement in the matter of treatment, for if the generalization is accepted a wide field of research is thrown open.

There can be little doubt that the use of colloidal lead in the prevention of recurrence after operation is a matter so important that every case subjected to operation for cancer, whether the disease be believed to be totally eradicated or not, should be treated as if the patient still had the disease. Owing to the pressure of work associated with the treatment of existing disease, mostly of recurrent nature, the author has not had the opportunity of making comparative studies in this matter. Nevertheless, the present is the time when this should be done, for if the method were to be further improved it might be considered unjustifiable for any surgeon to operate without subsequently treating the patient with whatever preparation might then be in use. It is to be hoped, therefore, that some arrangement will be found possible whereby surgeons will be able to treat two series of cases of the same type of disease by operation, administering lead subsequently to every alternate case. Obviously this would not lead to conclusions that could be considered statistically accurate, because the character and malignancy of the cases would vary, and no one man would be likely to have a sufficient number of cases from which to make a true statistical survey. Still, any scientific surgeon would be able to come to a more or less satisfactory conclusion in his own mind from such a study.

Again, with regard to the treatment of existing disease, it must never be forgotten that the action of lead is probably quantitative, and that satisfactory results naturally depend on the lead reaching the malignant tumour in sufficient quantity. At the same time poisoning the patient with lead at the same time can be done to lessen the quantity of lead necessary should be omitted; all large accessible growths should be removed, and in suitable cases x-rays may be employed in conjunction with intravenous injections of lead.

There are extraordinary differences in the susceptibility to the toxic effects of lead observed in patients. It is, however, rare to find a patient with a large growth affected to any considerable extent; it appears that the lead is attracted to the tumour.

It may be thought by some that the dangers connected with the treatment of cancer with lead, have been

exaggerated. In answer to this the writer points out that they have had a considerable experience, and have come to realize that to ensure good results it is absolutely necessary to give the patient as heavy doses and as much lead as can be tolerated.

Results.

The fact that disasters have undoubtedly occurred should be sufficient warning to those who intend to carry out this treatment, possibly with products of unknown toxicity. It is hoped in due course to establish an organization for those who wish to learn the methods, and to carry out the treatment on proper lines. When, if ever, the history of their endeavours and arrangements comes to be unimpassionately considered, it will be found that in no direction could they have acted in any other way than they have done, if they were to protect the public from danger and, at the same time, bring their work to a position of comparative security.

The results are given in Table III. If groups 1, 2, 3, 4 and 6 are excluded it will be seen that there is an extraordinary percentage of successes in a class of case that has hitherto never been successfully treated.

So far one line only has been explored with success that has been beyond expectation.

TABLE III.—Fate of Patients: November 9th, 1920, to November 9th, 1925.

	Cases.
1. Admitted, but died before treatment could be commenced	20
2. Died before treatment could be completed ..	50
3. Died of intercurrent affection ..	3
4. Died after treatment (including two deaths from acute nephritis, the result of lead poisoning) ..	106
5. Died as a result of extensive destruction of growth by lead ..	4
6. Too recent for results to be estimated ..	14
7. Complete treatment refused, but patients are living normal lives ..	9
8. Disease completely arrested ..	10
9. Relieved cured, and treatment stopped ..	31
	<hr/> 227

Treatment of Hookworm Disease in Pregnant Women with Carbon Tetrachloride.

By JOSE V. INSFRAN, M.D.,

Jour. Amer. Med. Assocn., March 13, 1926.

THE pregnant woman who is unfortunate enough to be suffering from malaria, kala-azar, hookworm or many other infections common in tropical countries is usually left untreated "for medical reasons," just when the necessity for treatment is most urgent. In this paper Dr. Insfran deals with the treatment of the pregnant woman suffering from hookworm disease.

Previous to the introduction of carbon tetrachloride, pregnancy was considered as a contra-indication to anthelmintic medication, thymol, oil of chenopodium and betanaphthol all being on the prescribed list. Lambert reported that he had begun treating pregnant women with carbon tetrachloride in June, 1922, and that during the following four months no abortions had occurred following the treatment of some hundreds of women. No details are given as to the length of time these cases were under observation following treatment. Soper more recently reported the treatment of sixty-three women, pregnant from two to eight months, with 2.4 c.c. of carbon tetrachloride with no serious immediate consequences, although two abortions were noted, one ten days, the other twelve days, after treatment. However under date of May 3, 1924, Dr. F. L. Soper received a personal communication from Dr. N. C. Davis stating that large doses of carbon tetrachloride had produced premature parturition in dogs.

During some fifteen months in which more than a hundred thousand of the general Paraguayan population were treated with a combination of carbon tetrachloride and oil of chenopodium by the Campana Sanitaria, all pregnant women were treated with carbon tetrachloride alone in a dosage of 2.4 c.c. with a simultaneous purge of magnesium sulphate. Most of these cases were treated without antecedent medical examination, and the diagnosis of pregnancy was made in most cases by the patient herself. Of the patients so treated, the author had been able to check up closely on 219. A further series of six cases were treated and carefully studied in a maternity hospital in Asuncion. All of the cases entering this report were under observation for a minimum period of fifteen days following treatment; sixty-three cases were under observation until after delivery.

Amongst these 5 abortions occurred. These five patients were in their 2nd to 5th month of pregnancy and the abortion occurred from the 8th to 29th day after treatment.

In none of these cases did threatening symptoms develop during the first four days following treatment, and in no case was the abortion attributed to the treatment by the patient. None of the women aborting showed any of the symptoms of carbon tetrachloride poisoning.

Data have been presented showing that pregnant women in all months may be safely treated with carbon tetrachloride without the production of dangerous symptoms in the days immediately following treatment. Although five abortions occurred in sixty-three patients followed to term, it is not apparent that there was a causative relationship existing between previous anthelmintic treatment and such abortions.

Pregnancy has been removed as a contra-indication to anthelmintic medication in the treatment of more than a hundred thousand of the general population without untoward results. Since the general population was being treated with a mixture of carbon tetrachloride and oil of chenopodium, and since pregnancy was not considered as a contra-indication to treatment but only as a condition for modifying treatment, the diagnosis of this condition being left to the patient, it was inevitable that some pregnant women, especially during the earlier months of pregnancy, should be treated with the mixture of the two drugs instead of with carbon tetrachloride alone. This is known to have occurred in some cases (not included in the group reported) and undoubtedly occurred in many others without untoward results. Although the dosage of 2.4 c.c. of carbon tetrachloride is efficient in areas where *Necator americanus* is the offending agent, it may be found inefficient in areas where *Ancylostoma duodenale* predominates. Further observation and trial may prove that it is safe to use a mixture of oil of chenopodium and carbon tetrachloride in such areas in the treatment of pregnant women.

Although the number of cases presented is small and the periods between treatment and re-examination are short, the indication is that the pregnant woman reacts almost immediately to hookworm treatment, as indicated by an increase of hæmoglobin.

Summary and Conclusions.

1. Pregnancy need no longer be considered a contra-indication to anthelmintic medication in areas where *Necator americanus* is the offending agent and carbon tetrachloride the anthelmintic used.

2. The use of a mixture of oil of chenopodium and carbon tetrachloride in areas where *Ancylostoma duodenale* predominates may be possible.

3. The pregnant woman reacts favourably almost immediately to anthelmintic medication.

Double Inguinal Hernia in Infancy: A New Incision.

By JOHN T. MORRISON, O.B.E., F.R.C.S. (Eng.),
Lancet, 27th March, 1926, p. 656.

It often happens in operating on infants with a double inguinal hernia that the question arises as to

the advisability of prolonging the operation by doing both sides at once. The general condition of the child, or difficulty with the administration of the anæsthetic, or both, may give rise to anxiety, and anything which will materially diminish the time taken by the operation will enable one, in certain cases, to avoid the necessity for a second surgical intervention. In dealing with the second side the time-consuming actions are (1) the changing over of the theatre staff and equipment to the other side of the table, (2) the rearrangement of towels and fresh preparation of skin, (3) the making and the closing of a second skin incision. These may all be avoided if the incision herein described is employed.

By means of a one-and-a-half inch transverse incision along the line of the crest of the pubis efficient access may be obtained to either external abdominal ring. The incision is deepened till the surface of the aponeurosis is reached. A small double hook retractor is placed in the angle of the wound, and with quite moderate traction the region of the abdominal ring is exposed. An oblique incision through soft parts parallel to Poupart's ligament discloses the cord and its coverings. The operation can then be completed in the ordinary way.

After dealing with one side the operator exposes and treats the other in exactly the same way. By this manœuvre the time of the operation can be very materially reduced. In cases where it is desired merely to explore the opposite side this incision is particularly useful, and if no hernia be found the additional time taken is never more than one or two minutes. Such a necessity may easily arise in infants in whom the presence of a hernia on the opposite side is easily overlooked.

R. W. Murray, in his book, *Hernia, Its Cause and Treatment*, goes so far as to say that 41 per cent. of young children with left inguinal hernia ultimately prove to have a right inguinal hernia as well. These figures would suggest that all cases of left inguinal hernia should be operated on by this method, so that the right side could be easily, rapidly, and adequately explored at the same time.

In conclusion, one last advantage may be mentioned. The transverse suprapubic incision does not, as a rule, involve the use of any artery forceps, as neither superficial epigastric, nor superficial external pubic arteries need be divided. By this means further time-saving is effected. Needless to say this method would not be adopted were any complication present such as irreducibility of the hernia or mal-descent of the testis.

Tuberculosis Immunization.

By NATHAN RAW, C.M.G., M.D., M.R.C.P. (Lond.),
British Med. Jour., March 27th, 1926, p. 566.

THE writer gives a short report of the work on this subject carried out at the Lister Institute; the conclusions at which he arrives follow—

The problem of tuberculosis resolves itself into the question of immunity. Contrary to what is observed in other infectious diseases, no immunity is conferred on the human by a previous attack of tuberculosis, caused by the same type of bacilli. Pulmonary tuberculosis, which is nearly always caused by bacilli of the human type, does not appear to give immunity in after-life, and patients whose disease has been arrested are liable after many years to another acute attack of active tuberculosis. Clinical experience, however, goes to show that children and young adults who have received a mild infection of bovine bacilli in milk, causing enlarged glands in the neck, bone and joint lesions, and other forms of localized tuberculosis, are practically immune to pulmonary tuberculosis, and it was this observation that led the author to use bovine bacilli to immunize animals and man against the more serious disease of the lungs.

It seems to be probable that children may be protected against infection in the household, but some years must elapse before this can be finally established. All

children over the age of 1 year who are living in the same house with a tuberculous member of the family ought to be protected if possible against infection, and it is in the early years of life that such infection usually occurs.

From a long observation of tuberculosis the author is convinced that if some active immunity can with complete safety be given to those children who are directly exposed to infection at home, a long step will have been taken in the direction of prevention, which, after all, is the key to the problem.

The protection of the community by some safe scientific method of active immunization is the only effective way by which this preventable scourge can be eradicated.

Renal Function Tests.

Lancet, March 6, 1926, p. 494.

At a meeting of the Royal Society of Medicine on February 25th, Prof. Hugh MacLean read a paper on the testing of renal function in relation to treatment. It was important to reduce the number of tests to a minimum, and all necessary information could be gained from the estimation of the blood-urea and the urea concentration in the urine. The blood-urea was variable; 20 mg. was about the normal for young people, but it might reach 80 mg. in healthy people past middle life. Many conditions other than kidney trouble could increase it, and alone it was unreliable, except that if it were normal the kidneys could not be in a very bad state. The water test, extensively used in America, gave much trouble to the patient but no more information to the doctor. The simplest test of all was to starve the patient of fluid from 15–20 hours and then estimate the urea in the urine by the hypobromite method.

Albuminuria was common; it hardly ever led to nephritis in children. The patient was usually a bit overgrown and neurotic and the urine showed no casts. In such a case the albuminuria meant nothing. Adults might have albuminuria and even casts without any symptoms of disease and with repeatedly normal readings in the urea tests. Another type of patient passed albumin, casts, and blood, and definitely had something wrong, probably a mild attack of acute nephritis. Recovered cases of nephritis might improve in their urea concentration from 1.3 to 4 or 4.5 per cent. and still have some albuminuria. Continuance of the albuminuria was, therefore, no indication that the kidney was passing into the chronic condition. Some perfectly healthy people continued to pass albumin for 20 or 30 years after an attack of scarlet fever.

Boys of 16 to 19 often passed a little albumin and had a blood pressure of 155/80. In most of these cases there were no subsequent developments. Many healthy people had abnormally high blood pressures without symptoms of ill-health.

Nothing much could be done in acute or chronic nephritis, said Prof. MacLean, except to put the kidneys under the best possible conditions. The patient should be kept warm and given glucose by the mouth. Diuretics were of no use; there was already an excessive amount of urea, which was the best diuretic known. In the parenchymatous type, where the patient had a tremendous oedema and was passing protein in the urine, a good solid diet with plenty of protein was beneficial. 80–100 gm. doses of urea sometimes promoted diuresis, which very often hung suspended on a trigger and was released by most unexpected factors. Baths were sometimes helpful, and nicking with a knife was better than Southey's tubes. There was no evidence that protein did any harm whatever. Animal experiments showed that a rabbit would not develop nephritis even on a diet containing 70 per cent. of protein if it were also given green vegetables in minute amounts. It was better to reduce the protein in very acute nephritis, but in advanced chronic cases it did not matter. It was wrong to interfere with a high blood pressure; the body became accustomed to it and the patient was

better left alone, unless it was causing definite symptoms. Sir William Willcox agreed that the two urea tests were the most important, but pleaded for the estimation of the chlorides in urine as almost equally important. They were always below 0.5 per cent. when the kidney was damaged, and might fall to 0.01 per cent. in water-logged cases.

Dr. Geoffrey Evans said that the most important part of the treatment was lengthy rest in bed, up to 12 months if necessary, at any rate until there were no red blood cells in the urine. Once a patient got well he remained well. Obvious septic foci should be removed. Too little was known about diuretics for a pronouncement on their value or harm. Diuresis might depend on extra-renal factors, as had been shown by recent experiments with "euphyllin," a diuretic which worked by causing a discharge of chlorides from the cells and their accumulation in the blood.

Syphilis of the Heart and Aorta.

Lancet, March 6, 1926, p. 496.

At a meeting of the Medical Society for the Study of Venereal Diseases, on February 26th, a discussion on syphilis of the heart and aorta was opened by Sir Thomas Horder, who stressed the supreme importance of making every effort to diagnose and commence to treat the disease before structural changes had set in. The disease was very prone to be latent. One reason for this latency seemed to be that neither of the structures of the heart which yielded physical signs was often affected by syphilis—namely, the pericardium and the endocardium. All were familiar with cases of aortic incompetence which there seemed every reason to attribute to old syphilis.

The thoracic aorta was more often attacked by syphilis in its early stages than was the heart itself, judging by the post-mortem data, the ascending part of the thoracic arch being the zone of attack par excellence. When the structures near the heart were involved by the disease there were two zones specially liable to attack—namely, the circle of Willis and its branches, and the base of the aorta and the part immediately above it. Between the primary infection and the invasion of these structures the period seemed to be about the same in each—namely, from five to ten years.

These manifestations were seen in people of 25 to 30, rather than from 30 to 40 years of age. All sorts of syphilitic developments occurred later in life, aneurysm a little later, aortic regurgitation later still. The doctor should be on the scene before these late sequelae developed.

The symptoms of early involvement of the aorta were largely problematical. Sir Thomas could never feel quite certain of his diagnosis of syphilitic aortitis, but he insisted that the safe course was to treat the patient as a syphilitic suspect. He attached great importance to substernal pain. This anginoid pain was liable to be increased by effort, but was not necessarily induced by effort.

Less helpful because more vague subjective features were a sense of oppression and discomfort in the chest, increased by effort, and shortness of breath, but the number of conditions in which this was present reduced its diagnostic value. Added to this was a feeling of general physical slackness, coupled with some anæmia.

In all cases in which there was substernal pain an aortic second sound should be carefully criticised. He considered that a blurring or lack of clearness in this sound should be seriously regarded, and it should be listened for also down the sternum and at the bottom of that bone.

He did not regard the presence of an aortic diastolic bruit as a proof of permanent aortic incompetence. On the subject of treatment Sir Thomas Horder said there was a great need to proceed as intensively as possible, short of inviting disaster. He had seen neo-kharsivan and such remedies given with much boldness, and had shivered for the result, but his anxiety had proved to have been misplaced. His own aim in these cases was

to be very intensive and very prompt with mercury, giving iodide of potassium at the same time, and following this up by a routine series of doses of novarsenobillon, etc.

Col. L. W. Harrison said that a statement frequently made was that it was unnecessary to treat a patient because of a persistently positive Wassermann if there were no symptoms, but the latency of cardiovascular syphilis and the difficulty of diagnosing it until serious damage had been done was a sufficient answer to those who took that attitude. With regard to treatment there was much difference of opinion as to the use of arsenical preparations, particularly in myocarditis, but he thought the arsenobenzol treatment had a definite place in the treatment of both myocarditis and aneurysm, though in the first of these care must be exercised. If small doses were commenced with and slowly increased there would be very little shock.

Radical Phrenicotomy for Pulmonary Tuberculosis.

By WILLIAM H. THEARLE, M.D.,

Jl. American Med. Assn., March 20, 1926, p. 812.

PHRENICOTOMY, or simple division of the phrenic nerve in the cervical region, was first suggested by Steurtz for lower lobe tuberculosis in 1911, but little interest was manifested in the therapy of this procedure till Goetze and Felix reported (early in 1922) the results of their extensive research work on phrenicotomy. The latter authorities showed that the hemidiaphragm does not remain completely paralysed after simple section of the phrenic nerve in from 25 to 30 per cent. of cases, owing to failure of interception of an accessory phrenic nerve which joins the main nerve below the first rib, and each devised a "radical phrenicotomy," which would also interrupt this accessory nerve, as well as any connecting cervical sympathetic fibres of the phrenic nerve, with resultant permanent paralysis of half the diaphragm.

Clinically, phrenicotomy effects a reduction of cough and sputum with improvement of the general condition, directly dependent on the location of lesions and the extent of pulmonary involvement; the quantity of sputum is frequently increased, however, for several days after operation. Patients usually state that coughing is more productive and the sputum raised much more easily than before nerve extraction, which is explained by the relaxed diaphragm permitting the abdominal muscles to empty secretions more forcibly and completely from the lower portion of the lung in coughing.

Phrenicotomy is a valuable measure in many cases of pulmonary tuberculosis; the disease should preferably be chiefly unilateral, with the maximum lesions predominating in the lower portion of the lung. The procedure, however, throws slight, if any additional work on the opposite lung ordinarily, and does not therefore exact the comparative freedom of contralateral active lesions that is required for the performance of extrapleural thoracoplasty or artificial pneumothorax: it is advocated in pulmonary tuberculosis under the following conditions.

1. For early cases that are not making satisfactory progress under modern sanatorium treatment, and whose disease will probably not become arrested by a continuation of such a regimen, the extensive use of radical phrenicotomy was suggested by John Alexander in 1924. He logically reasons from the decidedly favourable results obtained in advanced phthisis that the improvement following phrenicotomy will often weigh the balance in favour of health with progression to clinical cure in many unfavourable early cases.

2. For acute, febrile, predominantly caseous types, even with considerable activity in the other lung, which contraindicates thoracoplasty, and artificial pneumothorax is impossible on account of adhesions.

3. For chronic types of the disease, (a) when adhesions prevent pneumothorax and the patient's condition

does not warrant thoracoplasty, and (b) when the lesions are chiefly unilateral, with maximum involvement basal, which commonly progress to cavitation.

4. For advanced cases when no contraindication exists to artificial pneumothorax or thoracoplasty, phrenicotomy is preferred by Goetze, which obviates the dangers incident to the two former procedures. He reports 50 per cent. of cases improved, with many clinical cures from phrenicotomy alone.

5. As a supplementary measure to artificial pneumothorax. The advantages of phrenicotomy to this therapy are: Pleural effusions are smaller and fewer; the interval between refills is lengthened; the pulmonary compression and rest are more uniform, owing to loss of the pumping action of the diaphragm in respiration, and the danger of reactivation of the disease after completion of pneumothorax therapy, as well as in those who prematurely abandon pneumothorax, is materially lessened. Phrenicotomy is also advocated to relieve the distressing irritative cough not infrequently present in pneumothorax due to the pull of adhesions about the diaphragm, and for persistent hemoptysis, which pneumothorax fails to stop because of basal adhesions.

Opinion is divided as to whether phrenicotomy should precede artificial pneumothorax or be performed shortly after the latter therapy is begun. The author has not observed any added advantages between these two methods, but believes that the operation should be performed early in this treatment. Some German clinics recommended phrenicotomy in conjunction with every complete, and even satisfactory, pneumothorax.

6. As a supplementary procedure to extrapleural thoracoplasty. Its advantages preliminary to surgical collapse are: (1) easier coughing and expectoration, which reduces to some extent the risk of postoperative aspiration; (2) gradual adjustment of the thoracic viscera for the consequences of thoracoplasty; (3) sufficient improvement in some advanced subjects to make them suitable subjects for thoracoplasty later; and (4) to increase the compression of an extensively diseased lower lobe, especially the right, which thoracoplasty alone often fails to collapse adequately because of the liver enlargement usually present in advanced phthisis of any duration.

Sauerbruch performs phrenicotomy to determine the status of suspicious lesions in the better lung, and thoracoplasty after three weeks if no clinical evidence of activity is manifested by that time. Sauerbruch, Brunner and others advocate phrenicotomy with every thoracoplasty.

The author agrees with those thoracic surgeons who warn against the independent use of phrenicotomy as a curative measure in advanced pulmonary tuberculosis. His decidedly favourable although limited observations lead him to agree with Alexander's suggestion that radical phrenicotomy will cure some early patients with chiefly unilateral lesions, who fail to improve under sanatorium regimen alone.

In his experience, radical phrenicotomy is especially advantageous in conjunction with artificial pneumothorax and extrapleural thoracoplasty, and is the primarily indicated surgical procedure in unilateral phthisis with predominantly basal lesions.

Reviews.

OFFICIAL HISTORY OF THE CANADIAN FORCES IN THE GREAT WAR, 1914-19. THE MEDICAL SERVICES.—By Sir Andrew Macphail, Kt., O.B.E., B.A., M.D., C.M., LL.D., M.R.C.S., L.R.C.P., F.R.C.S. Ottawa: F. A. Acland, 1925. Pp. 428.

THIS ably written work is of absorbing interest even to those who had nothing to do with, and knew nothing of, the Canadian Medical Services during the Great War. The writer's is a master hand—he was formerly editor of the *University Magazine of Canada*, and of

the *Canadian Medical Journal*, and is now Professor of the History of Medicine in McGill University.

The story, from the medical aspect, of the mobilisation of the Canadian Forces at Valcartier, and of the winter spent on Salisbury Plains, is well told.

Sir Andrew was an officer in the 6th Field Ambulance of the 2nd Division, and gives first-hand information concerning the work of that and other field ambulances in the Ypres salient, on the Somme, at Vimy and Passchendaele, and around and ahead of Amiens to Mons in 1918.

There are other chapters dealing with the surgery of the front, administration, organisation (and the 1917 re-organisation), base and lines of communication establishments, the ancillary services, mortality, diseases, etc.

The whole story to the taking up of the positions on the Rhine, and concluding with a description of the arrangements made for demobilisation, constitutes a masterpiece in the art of writing war medical history, and holds one's unflinching attention to the last.

G. S.

COLLECTED PAPERS OF THE MAYO CLINIC AND THE MAYO FOUNDATION.—Edited by Mrs. M. H. Meilish. Vol. XVI. 1924. Philadelphia and London: W. B. Saunders Company, 1925. Pp. 1,331. Illustrated. Price, cloth 60s. net.

A NEW policy now governs the selection of material for these reprints. The volume is a complete reference record of all papers from the Mayo Clinic in 1924, but only those articles likely to be of general interest are reprinted in *extenso*. More technical or highly specialised articles are either presented as an abstract or referred to by their titles alone. This is an excellent departure, as it allows of fuller reprints of the more prominent papers of the year. Even under this arrangement over 200 papers are reprinted, covering every field of medicine.

We turn first to the section on stomach surgery in which department the Mayo Clinic, with its vast concentration of material, may justly be said to lead the world. One is struck at once by the absence of the fierce controversies of some years ago on the relative merits of gastrectomy, gastro-enterostomy, wedge resection and local excision. The position has now become stabilised and each of these operations has its sphere of usefulness recognised. That all the world now does much the same operations for the same gastric conditions is a fact which strikes one when visiting the London clinics, and for this satisfactory state of affairs the Mayo Clinic may claim much of the credit.

Mann has some interesting experimental work proving that jejunal ulcer is due to the passage of gastric secretion unchanged into the duodenum and emphasising the need of continued alkalinisation during the post-operative period, an important point which only seems to be properly appreciated in the Mayo Clinic, where the gastric patients after operation are sent back to the medical wards for dieting and general treatment. Balfour reviews the results of the gastric operations of recent years and shows that in duodenal ulcer 88 per cent. of cures are obtained, in 3.5 per cent. there is recurrence of the ulcer, in 5 per cent. recurrence of hæmorrhage. Removal of the gastric ulcer by excision if small, and by gastrectomy if large, is advocated, the risk of these large ulcers being malignant being very real. Gastro-enterostomy is the operation of choice for duodenal ulcer, the end results of local excision being uncertain. In a series of 80 gastrectomies, including 36 cases of carcinoma, there was only one death from pneumonia, a testimony to the efficiency of the pre- and post-operative supervision; 50 per cent. of the deaths in gastric surgery are due to pneumonia and the use of ethylene anaesthesia is said to reduce this incidence. A long paper by Verbrugge on gastro-jejuno-colic fistula discusses the causation of this condition, which is fortunately rare, as its cure by operation is a very complicated procedure.

Mann has some papers dealing with experimental investigation of the functions of the gall-bladder and the effects of its removal, but it cannot be said that anything very new has been brought to light. Judd and Burden deal with the treatment of post-operative stricture of the common bile duct, one of the most difficult procedures in surgery, unfortunately becoming more common as the operation of cholecystectomy is being more extensively performed by comparatively inexperienced operators. Experience has shown that the best method is to reconstruct the duct over a T-shaped rubber tube, which thus allows of drainage during healing. Recurrence of the stricture may take place after removal of the tube, but nevertheless the results of this method are superior to methods of reconstruction which make use of bits of fascia or intestine, all of which tend to atrophy and fibrose up.

Judd and Pollock have an interesting account of diverticulitis, a condition which is attracting increasing attention and which frequently requires operation, though the best methods of treatment cannot yet be said to have been settled.

Bumpus reviews the treatment of malignant tumours of the bladder, showing that the best results have been obtained by the use of radium in association with diathermy or operation, rather than alone. There are many interesting papers on goitre, in particular one by Booth in which, whilst stressing the value of pre-operative preparation of exophthalmic cases with iodine, attention is drawn to the harm which may result if care is not taken to differentiate cases of thyroid adenoma from those of hyperthyroidism, a point on which Berry of London has always insisted. In such cases hyperthyroidism may be initiated or made worse by the administration of iodine, as first shown by Kocher. In any general scheme of mass treatment of a goitrous population by mixing iodine in the salt or other method, this danger must be taken into consideration; it affects mainly the adults in whom the goitres, being of long standing, have formed adenomas.

The value of sulfarsenol in syphilis when administered by the epifascial method and its superiority to other arsenical preparations in all forms of syphilis finds recognition in a series of papers, but we are surprised to find no reference to the use of bismuth in papers dating from 1924.

Arthroplasty is now being extensively investigated in the clinic. Melville Henderson records 103 cases with 81 per cent. benefited and 62 per cent. of good results. He emphasises the need of careful selection of cases, choosing infective arthritis with bony ankylosis in which there has been a quiescent interval of at least a year, of explaining the lengthy and painful nature of the treatment to the patient and securing his co-operation and of the unwisdom of interfering with a stable joint ankylosed in good position. With all of which we are in complete agreement, as we are of opinion that arthroplasty is not yet an operation suitable for India.

These are only a few out of many fascinating papers which want of space precludes our dealing with. We commend the study of this volume to all desirous of keeping in touch with modern trans-Atlantic work.

W. L. H.

SCOLIOSIS.—By Samuel Kleinberg, M.D., F.A.C.S., Assistant Surgeon, New York Hospital for Ruptured and Crippled. Paul B. Hoeber: New York. Pp. xvi plus 311, with 140 illustrations. Price, \$6.00 net.

Scoliosis is a disease which one does not often meet with in India, a fortunate circumstance when one considers the length of time the treatment takes, the patience and attention to detail required, the absolute necessity for the co-operation of an orthopedic surgeon with a trained gymnastic instructor and the hopeless relapses which occur when the treatment is abandoned prematurely, as it most certainly would be in the case of the average Indian patient.

The practitioner who only occasionally sees a case of scoliosis will find all the help he needs in this small monograph. The ætiology, diagnosis and clinical examination are dealt with in detail. There is much difference of opinion as to the ætiology of this disease, the ordinarily accepted causes are found to account for only 10–15 per cent. of the cases, the rest being "idiopathic." Recent American work has demonstrated epiphyseal lesions in a high proportion of these cases, but we are not told how far these observations were controlled by comparison with the supposed normal. In days to come when the children of India are systematically inspected by medical officers throughout the country, we may expect much light to be thrown on obscure orthopedic problems by the differing incidence of this and other conditions in the races of mankind.

The differentiation of postural from rigid cases is carefully considered, gymnastic exercises with and without apparatus are described and illustrated adequately enough to enable the practitioner to supervise the performance of them, and the various methods of utilising plaster jackets for forcible correction are given in detail. Last comes a section on the treatment of certain cases by an operation which is a combination of Hibb's and Albee's methods of fixing the spine, for which the author claims 31 successful results out of 33 cases. This is experimental ground, on which English orthopedic surgeons hold different views. The practitioner, to whom we recommend this book, would be well advised to avoid this field; it is for the expert only.

W. L. H.

MODERN VIEWS ON DIGESTION AND GASTRIC DISEASE.—By H. Maclean, M.D., D.Sc., M.R.C.P. London: Constable & Co., Ltd., 1925. Pp. 170, with 14 charts and 23 figs. Price, 12s. 6d.

THERE can be no doubt that the Modern Medical Monographs, of which this is the latest example, have proved of great service to the busy practitioner.

He now finds information concisely arranged for which previously he would have searched in all the recent papers and publications on the subject.

Professor Maclean is now editing the series and is the author of this number.

Those who have read his previous monographs will expect a clear, concise and above all, a modern view of the subject. They will not be disappointed.

Descriptions of the anatomy of the stomach and the physiology of digestion occupy the first two chapters in 38 pages. These descriptions are of necessity brief, but the essentials are there.

The importance of regurgitation of the pancreatic secretion during normal digestion is especially considered, and the recent experiments in this connection are described. The chief gastric symptoms and diseases are classified in a delightfully simple way. We might almost cavil at the simplicity, but we feel that that is due to our upbringing.

Do we not all remember the complicated classifications in the more popular text-books; functional, nervous and organic diseases, described in many varieties, with special chapters on dyspepsia and other symptoms.

It is not so here. Professor Maclean is content with four main functional disorders and three organic diseases. This indeed covers the whole field and stress is laid on the importance of disease in other organs as a cause of gastric symptoms.

The fractional test meal is described at length, and we realise that it is a very important, if not the most important, modern method in the diagnosis of a difficult case.

The author lays special stress on the absence of free HCl and the presence of lactic acid as a definite indication of cancer.

From the table of 100 cases of cancer this sign appears to be almost pathognomonic. The ordinary clinical symptoms and signs are rather briefly described.

Two important rules are laid down.

Pain with tenderness almost always indicates organic disease, and always suspect cancer in a patient over

40 who gets dyspeptic symptoms with no apparent cause and no previous history of dyspepsia.

The description of the radiological examination of the stomach and duodenum is excellent and is very well illustrated.

Professor Maclean never wastes words over long and various descriptions of treatment. The treatment of gastric disorders is described in 17 pages and this includes one page entirely devoted to a consideration of gastro-enterostomy.

Still, the essentials of treatment are there, and given an accurate diagnosis, this is really all that is necessary.

An excellent table of the modified Sippy treatment of ulcer is very useful.

Finally we must thank Professor Maclean for producing a book which will help us in presenting a difficult subject to the medical student in a clear and logical manner.

We recommend the book to all students before their final examination and there is no doubt that every medical practitioner will here find a difficult subject simplified and made easy.

H. H.

PREVENTIVE MEDICINE.—By Mark F. Boyd, M.D., M.S., C.P.H. Second Edition. London and Philadelphia: W. B. Saunders Co., 1925. Pp. 429, fully illustrated. Price, cloth 20s. net.

WE have great pleasure in reviewing the second edition of this book which is brought up-to-date with an addition of new material and amplification of old in some directions. It does not assume any originality for the material presented, but it has utilised all available sources of information on the subject of preventive medicine, for the use of students and medical practitioners.

The description is necessarily brief, but for those workers on public health who desire wider knowledge numerous references have been given at the end of every chapter. All medical practitioners have certain responsibilities towards public health, and the realisation of these is brought home to them by the pages of this valuable book. There are 135 excellent figures and diagrams, and the book is very well printed and well bound.

After an introductory chapter, the book is divided into 8 sections, the first and the largest being on epidemiology. For the student for a Public Health Diploma the sections on demography and public health administration can be thoroughly recommended.

R. B. K.

MANUAL OF HYGIENE AND PUBLIC HEALTH, WITH SPECIAL REFERENCE TO THE TROPICS. A TEXT-BOOK FOR MEDICAL AND PUBLIC HEALTH STUDENTS.—By Dr. Jahar Lal Das, D.P.H., with an Introduction by Lieut.-Col. W. C. Ross, M.B., Ch.B., D.P.H., I.M.S., Director of Public Health, Bihar and Orissa. First Edition. Calcutta: Butterworth & Co. (India), Ltd., 1925. Pp. 634, with 105 illustrations. Price, Rs. 5-10-0 net.

As explained in the preface this volume should have been the 5th edition of the book entitled "A Treatise on Hygiene and Public Health" written under the joint authorship of Dr. B. N. Ghosh and Dr. Jahar Lal Das. By a mutual agreement Dr. Das alone has brought out this volume under a somewhat different name.

The introductory chapter is written by Lieutenant-Colonel Ross, I.M.S., Director of Public Health, Bihar and Orissa, and in few but choice words he has shown what this book contains and what value it gives in the form of knowledge both to public health students and to health officers.

The book is concise but comprehensive, and tries to give up-to-date information on the whole subject. Of many new matters introduced in this volume, two new chapters require special mention, viz., "Public Health Survey," p. 158 and "Camp Sanitation," p. 603. In the appendices are given the duties of medical officers of health (in Bengal and in Bihar and Orissa), model

rules for municipal sanitary inspectors, and rules and orders regarding foods (Bengal and Bihar and Orissa). The experience of the author both as a teacher and sanitarian adds to the value of the book.

There are 105 illustrations, some of them are very good and explanatory.

The process of purification of water by rapid mechanical filters is clearly explained, but it would have been better if diagrams of both the Jewell and Paterson (gravity and pressure) filters had been given. Similarly, although the new process of purification of sewage called the activated sludge process is explained on pp. 324-25, yet an illustration would have added to the value of the description.

The chapter on medical entomology, p. 398, deserves special mention; it contains excellent pictures of mosquitoes, fleas, bugs, ticks and lice. The chapter on village sanitation and mass education also requires special mention.

The book is very well printed and well bound. We thoroughly recommend this book to all students and public health workers in India.

R. B. K.

BYWAYS TO HEALTH.—By T. D. Wood, A.M., M.D., and Theresa Dansill, A.M. London: D. Appleton and Co., 25, Bedford Street, W. C. 2. Cloth, illustrated. Pp. 198. Price, 5s.

THIS is an admirable little book, for the layman, for the doctor, and for the latter to prescribe to the former. Humour is the salt of life, and to judge by the delightful illustrations and the still more entertaining epigrams, quips and quotations with which this book is so profusely endowed, neither author is lacking in the first essential for a happy life. There are a hundred-and-one good stories in it; and all of them drawing-room stories. We should like to quote extensively; but considerations of space compel us to refer our readers to the original. The best tit-bit of all perhaps is the story of the lady who applied for admission to Heaven on the score that she had only been good in her life at one thing,—cooking; she was immediately admitted. The layman is apt to become rather tired of being told by his physician what he ought to do and ought not to do; what to avoid and what to pursue. But he will not become tired of this book; he will revel in it. If *Punch* brought out a health manual it might be on some such lines.

There are thirteen chapters in all; they deal with the necessity for a general stock-taking in health; nutrition—in connection with which such problems as breakfast or no breakfast, likes and dislikes in eating, over- and under-weight, are considered; with worry—a chapter which is altogether admirable; cheerfulness; rest and sleep; recreation and exercise; work in relation to health; happiness; "nerves"—again an excellent chapter; pirate-beacons—a much needed chapter on patent remedies and cures; headaches; "good to look at"; and taking a general individual inventory. The instructions given are clear, concise and to the point. "All about us", write the authors, "are tired men and women who were meant for happiness..... In this vast army are professional and business men and women, mothers in homes, students in colleges and schools, workers in every vocation and walk of life. They have no actual disease or irremediable defect, but they are nervous, uncomfortable, restless, easily fatigued, and drag wearily through the day. They lose hours, days and weeks because of some minor illness that in many instances need not have been theirs. Sometimes a detour in their habits of living and thinking is what they need." It is exactly what this book provides.

There are many admirable pages in this book. Constipation, it is claimed, is a curable disorder, even among women. The reason why perhaps the majority of modern women are constipated is simple,—they do not drink enough fluid during the day. On the other hand, the elderly male tends to drink too much fluid, and to suffer from obesity as the result. "Worry"

is an admirable chapter; we are counselled to take out-of-door exercise, not to strive to disentangle difficult situations in the hours which should be given to recreation or to rest and sleep. The bitter and the sweet are the common lot of life, and they should be taken as such. "Rest and Sleep" is another admirable chapter; in this connection even an elementary survey of the facts shews that different individuals differ enormously in this respect; some must have a nine hours nightly sleep if they are to be fit the next day, others can do with three hours; whilst age affects the problem. (In India for example it is customary for at least nine-tenths of the inhabitants to wake at dawn or earlier, but whether this custom, or that of the early morning ride for Europeans is or is not advisable, is a much debated point. The authors insist upon the value of the "beauty-sleep"; in India this is often between the hours of 5 and 7 A.M.). Sleep is the "great composer"; it alone renders human life tolerable.

The difficult subject of work is well dealt with. The instinct to work is born in most persons, only in some it never grows up. Modern conditions seem to be making the senses more keen and the perceptive faculties more acute. Change of occupation was Mr. Gladstone's recipe, and not a bad one. Organisation of one's duties so that they do not overwhelm one is a second alternative; the man who is always over-rushed is, usually the one who has no mental tidiness, who cannot adjust himself to the strain of daily life. One can always adjust; even the turtle had to climb the tree when he was pursued by the alligator.

Sufficient has been said to shew the general scope of this charming and amusing book. Humour is rare in books of this type; it is perhaps all the more valuable as a means of education.

A TEXT-BOOK OF MIDWIFERY.—By Kedar Nath Das, C.I.E., M.D. Second Edition. Calcutta and Simla: Thacker, Spink & Co., 1926. Pp. 495, with 291 Illustrations. Price, Rs. 12.

It is a pleasure to welcome a revised and second edition of this book, which has earned a well-merited popularity since 1921. The second edition has been brought up to date and contains all that any student in an Indian or European University would be expected to know. But if one might say so, how much more valuable would this volume be if it contained the personal touch, the personal experience, indeed the ego of the writer.

Dr. Kedar Nath Das holds a unique position in Bengal, for there is no other obstetrician in India who has 40 years' experience of specialist work to look back upon. For four decades he has been working and observing in one field alone and during these decades he has had countless opportunities of watching methods and results of treatment and prognosis in every branch of gynaecology and obstetrics among the Indians. Surely he could give us a list of aphorisms worthy of Swaine or Smellie applicable to the Bengali.

We cannot conceive a more worthy object in the next edition than to write it from a treatment and prognosis point of view as he has found things best and most suited for India and Indians.

Let him tell us what he does for breech, R.O.P., dry labour, and patients who refuse Cæsarean or interference.

Let him tell us of the tragedies of hyperemesis and ruptures of the uterus.

Let him tell us of the triumph of Nature in first labours and sepsis.

Despite the worst misgivings there are a thousand ways in which Dr. Das could help to enlighten the student, post-graduate and professor by his own ego.

All midwifery books are more or less alike, but one by a professor and teacher who has by sheer dignity, integrity and personal merit reached the position, he has, in the Indian obstetric world, would indeed be a pearl of great price and a hundred years hence be a classic of what obstetric practice was like in the first

quarter of the 20th century, and would stand as a monument to the example and teaching of Bengal's greatest obstetric guru. Therefore, seriously and earnestly, we ask Dr. Das to consider this, leaving out nothing in the detail of treatment, or diet, or prognosis in a book of midwifery for India, suitable and applicable to Indians, as he has found best in his long experience.

V. B. G. A.

TUBERCULOSIS (OR CONSUMPTION) OUR GREATEST FOE.—By Chuni Lal Bhatia, L.R.C.P., L.R.C.S. (Edin.). Amritsar: The Union Press. Pp. 79. Price, 6 annas.

THIS little book is for the layman, whether well or sick; and follows upon customary lines. It gives in simple and clear language information as to the ætiology of tuberculosis, its various manifestations, modes of spread, symptomatology, treatment in the sanitarium or at home, and indications of progress. What is exceptional about the book is that its style and English are both good, and it is well written. The more widely that such small and cheap books can help to broadcast information about tuberculosis among the Indian population, the better.

The author is tremendously impressed with the importance of tuberculosis as a scourge in India; also with its frequency as a sequel to influenza and other pulmonary diseases. Certain features of the book are of special interest; for instance the author does not believe in the non-infectivity of Indian cattle, and considers that the Indian habit of "leeping" the floor with cow-dung may be dangerous. Bad conditions of housing and the *purdah* are rightly stated to be the chief factors in the spread of tuberculosis in India. In an appendix rules for admission to the King Edward Sanatorium at Dharampore are given, and notes on the collection of sputum for examination.

The book may be recommended to laymen. In one point perhaps the author's views need modification; he is inclined to consider surgical tuberculosis as especially affecting the young in India. In the reviewer's experience, surgical tuberculosis is quite common in Indian adults, and even in old age in India; both abdominal tuberculosis and Pott's disease are not infrequent in Indian adults. Also attention might have been drawn to the fine tuberculosis sanatorium at Madanapalle in South India which is doing pioneer work with regard to this disease in India.

THE THERAPY OF PUERPERAL FEVER.—By Dr. R. Kochler. American Edition prepared by Huga Ehrenfest, M.D., F.A.C.S. St. Louis: The C. V. Mosby Co., 1925. Pp. 276, with 27 illustrations. Price, \$4.00.

THE title of the above would lead one to think that here one had Pandora's box and that it was but a matter of opening the lid to disclose all the most bounteous gifts of Jupiter. But woe is me and sadly have I read 250 pages with a bibliography of 1,500 names and addresses.

The more one reads of puerperal sepsis the more certain one becomes that there is no royal road to treatment, for some cases recover with no treatment or despite treatment. Whereas others die, with the finest brains and laboratories at their disposal, and the sooner we recognise this fact the better.

Every year brings a new preparation or method, but the fact remains that proper prophylaxis, i.e., proper supervision and ante-natal care, which would foresee or guard against sepsis is the only real means of preventing this disease.

Dr. Kochler is greatly against uterine douches or exploration for fear of extending the infection, and yet in India despite all our teaching, one finds this constantly done.

The greatest force in this treatment is the *vis medicatrix nature* and if one can help it, arsenical compounds, or immuno-transfusion or postural drainage, then one is at least not interfering with Nature.

Dr. Kochler's book is a compendium of applied pessimism and one cannot but feel grateful for such diligent

care taken to prove what has been hitherto the personal supposition of all specialists.

V. B. G. A.

Annual Report.

REPORT ON THE HEALTH OF THE BRITISH ARMY FOR 1923. BY THE LATE SIR WILLIAM B. LEISHMAN, DIRECTOR-GENERAL, ARMY MEDICAL SERVICES. LONDON: H. M. STATIONERY OFFICE.

IN INDIA AVAILABLE FROM MESSRS. THACKER, SPINK & CO., CALCUTTA; MESSRS. THACKER & CO., BOMBAY; AND MESSRS. HIGGINBOTHAMS, MADRAS AND BANGALORE. PRICE, 3s. 6d. net.

THIS report, although somewhat belated, was published in November 1925, and we regret the delay in reviewing it; its general scope is so wide that it is difficult to review. At the same time it will be of special interest to all military medical officers in India, for with Sir William Leishman's signature, it is well written and not a mere record of figures.

The report begins with a general survey of the health of the British Army both at Home and abroad. The health of officers continues to show improvement, the death rate for the year being 3.93 per mille and the constantly sick rate 13.03 per mille. The health of soldiers also continues to improve steadily, the death rate being 2.84 per mille, and the constantly sick rate 28.54 per mille. Of 92,750 admissions to hospital no less than 13,158 were for malaria, and this disease stands first in order of importance in the British Army; venereal diseases being second, with 10,807 admissions. Rates per mille for malaria are 68.7, for venereal diseases 56.4, for inflammation of the tonsils 29.0, and for sandfly fever—which is clearly a special army problem—22.0. Invaliding, which reached a prominent figure in 1921, after the close of the war and demobilisation, has dropped steadily in subsequent years and amounted to 14.50 per mille of strength. This figure is still, however, higher than in the pre-war years, and among the contributory causes otitis, tuberculosis, and disordered action of the heart are the most prominent.

The following are notes on the principal diseases concerned in the sick rate:—

Diphtheria.—Bacteriological investigation for the presence of *B. diphtherie* in cases presenting the clinical appearance of diphtheria, and in the throats of men in contact with such cases, is a routine laboratory procedure in all stations.

In the Scottish Command, among 310 bacteriological examinations of the throats of suspected cases, *B. diphtherie* was isolated from 13 cases, and in the London District the specific microbe was isolated in 14 out of 810 cases examined; but it does not follow that all the men from whom the Klebs-Löffler bacillus was isolated were suffering from clinical diphtheria, since microbes having the morphological appearances and cultural reactions of *B. diphtherie* are sometimes isolated from contacts and from carriers who present no clinical symptoms, and it has not always been possible to prove the virulence of the bacillus by animal experiment. In the Dardanelles, where diphtheritic sore-throat was common, it was found that in 50 per cent. of cases from which bacilli resembling *B. diphtherie* were isolated, the microbe was found to be non-virulent to guinea-pigs. All cases, however, which present the clinical aspects of diphtheria are immediately treated by the specific antiserum without waiting for confirmation of the morphological findings.

Sporadic infections with diphtheria were not uncommon in the Eastern, Aldershot and Scottish Commands at home, on the Rhine, and in Cairo and Alexandria, where the troops were exposed to contact with the civil population.

Dysentery.—This disease shows a definite increase, giving an incidence ratio of 6.6 per 1,000 compared with 4.7 in 1922. This increase is traced to Iraq but also, in a less degree, to India; the other stations in which it prevails show a decrease.

Dysentery occupies a high place as a cause of inefficiency, particularly in respect of the constantly sick, the average being 117.6, and taking dysentery, diarrhoea and colitis together the admissions number 3,083 or 16.1 per 1,000.

In Iraq, the large increase from 10.2 to 104.3 per 1,000 is attributable to an outbreak of dysentery and diarrhoea affecting a column of troops operating in Northern Kurdistan in April when some 200 cases occurred. In Turkey, the incidence fell from 20.0 to 9.7, and this is probably explained by the fact that the evacuation of this area took place before the real dysentery season had set in though, at the same time, special precautions were taken to lessen the spread of infection by flies.

During the concentration of troops at Chanak and Kilia in 1923, diarrhoea and bacillary dysentery, due to infections of the Flexner group, constituted one of the three main causes of disability, the others being malaria and venereal disease.

Although there was no epidemic of dysentery in the Dardanelles, yet the disease appeared with remarkable rapidity following the concentration of troops at Kilia, being manifest within 14 days, and was almost constantly present to the extent of one or two cases in one or more units.

In Turkey, during the winter of 1922-23, a special endeavour was made to put the diagnosis of dysentery on a sound footing by tightening up the liaison between the dysentery wards and the laboratory.

At the central laboratory at Kilia, in 237 examinations of cases of acute diarrhoea with blood and mucus in the stools, bacilli of the Flexner group were isolated 156 times, bacilli of the Morgan group 39 times, Schmitz group 30 times and Shiga group 12 times. *B. dysenteriae* was therefore isolated in 70 per cent. of the cases showing clinical symptoms of dysentery. This result demonstrates the prevailing type to be bacillary and that primary cases of amoebic dysentery among British troops in that area were extremely rare. The places occupied by troops were Constantinople, the east side of the Bosphorus, Gallipoli and Chanak. Clinically, the cases were not very severe, and the great majority responded readily to the saline treatment; antiserum was administered in a few cases only.

During this investigation in Turkey it was noticed that when dysentery prevailed there were many cases of diarrhoea, and a closer inspection of these revealed mild and unrecognised cases of dysentery, from some of which a specific organism could be isolated.

Experience in this area points to the probability that many cases diagnosed as diarrhoea in districts in which dysentery is endemic are mild bacillary dysentery, and in the above-mentioned stations there was a high incidence for diarrhoea and colitis.

The prevailing type of bacillary dysentery, though not infrequently relapsing, does not as a rule necessitate invaliding home, although, on the evacuation of the troops from Turkey in September, 1923, 56 cases of dysentery were evacuated to Malta for bacteriological investigation and treatment and 55 were due to *B. dysenteriae* Flexner Y infections and one was caused by *B. Shiga*.

The majority of cases invalided home were amoebic, and for the same reason—the tendency for amoebic infection to persist—the majority of admissions at home stations were of the latter type.

It is noteworthy that dysentery and other intestinal diseases are almost entirely absent in the Malaya Command.

Enteric Fever.—The incidence of enteric fever in the whole army remained low, being 1.1 per 1,000 of the strength compared with 1.2 in 1922, 1.5 in 1921 and 1.1 in 1913.

These figures show that this disease was a very small factor in causing disability among the troops; a

circumstance largely due to the fact that about 90 per cent. of the men serving overseas are protected by inoculation.

Influenza.—This disease shows a considerable decrease compared with 1922: 1,453 cases, a ratio of 7.6 per 1,000, compared with 6,153 cases and a ratio of 29.6 in the previous year.

The following commands show the highest incidence:—Jamaica 112.7, Ceylon 102.2, Malaya 52.7, South China 31.2, Rhine 21.9, Turkey 19.6.

There was nothing in the nature of an epidemic in the home commands and the cases were of a mild type. It was noted at Woolwich that certain of the cases suffered a definite relapse.

In Jamaica an outbreak of a mild fever seems to occur each winter and there is doubt as to whether it is influenza or a type of mild dengue. It has two special features, (1) new-comers to the island mainly are affected, and (2) the attack is invariably followed by prostration out of all proportion to the severity and duration of the fever. In the returns for 1921 and 1922 these cases appear as pyrexia of uncertain origin. A comparison of the returns for the last three years shows the tendency to diagnose the fever as influenza.

In the Rhine, though there were 180 cases, there was nothing in the nature of an epidemic, but in some cases gastro-intestinal symptoms were present.

In Turkey, the disease was prevalent both in Constantinople and the Dardanelles and reached its maximum incidence in March. Mild in character, it was fairly evenly distributed throughout the force, but wherever sporadic cases occurred there were numerous complaints of "colds," probably very mild forms of the infection. In only one instance did the disease assume the form of an epidemic. The clinical features of this outbreak are worthy of special note.

The cardiac sequelæ of influenza definitely attracted attention. There was one case that developed acute endocarditis terminating in cerebral embolus and death: at the post-mortem *B. Pfeifferi* was recovered from the vegetations on the mitral valve and from the spleen. Several cases came under observation for myocarditis and dilatation, and a number developed a degree of disordered action and tachycardia which prolonged convalescence and necessitated transfer to Malta owing to the military situation.

Malaria.—Of all diseases malaria caused the greatest number of admissions (13,158). While the actual number is 360 less than in 1922, the ratio per 1,000 of the strength is 68.7 compared with 65.0 in 1922. In 1913 the admissions numbered 9,961, a ratio of 47.4; therefore this year's ratio represents a 44 per cent. increase on 1913. This increase is easily accounted for by our post-war commitments in the East, the occupation of Turkey, Iraq and Palestine, and mobilisation on the Waziristan frontier.

The incidence rate in different stations is as follows:—

	1923.	1922.
West Africa ..	552.3	582.0 (garrison 239)
Iraq ..	278.6	66.0
India ..	172.2	175.4
Mauritius ..	75.2	32.5 (garrison 133)
Egypt ..	67.4	90.7
South China ..	65.2	120.9
Ceylon ..	35.6	12.3
Turkey ..	25.6	40.0
Malaya ..	22.3	15.4

In West Africa the seasonal prevalence of malaria brings to light certain important features in its causation. There was a slight rise during the dry weather, due to the training season, when troops were away from the cleared and protected areas. There was a very marked rise with the onset of the rains, reaching a maximum one month before the maximum rainfall. There was a marked fall when the rains became heavy, and the rise of water in the streams washed away breeding places. In view of the unhealthiness of frequently changed, but as men were retained there long enough to become infected with malaria, the result was

that a very large proportion of the garrison became infected. The type of malaria was a mild form of subtertian.

Tower Hill, which is well cleared of bush, was practically free from malaria, whereas Wilberforce and Hill Station Ridges, which are 300 feet higher, produced most cases, as the military authorities have not the same power to clear the bush from the neighbouring areas. Owing to the late rains it was necessary to retain the services of the grass cutters till late in December. All ranks were supplied with mosquito nets.

In Iraq a great increase in the incidence rate is noticeable. This increase is no doubt related to the facts that the garrison was reduced from 3,820 in 1922 to 1,985 in 1923; that such general preventive measures as would tend to reduce the incidence of the disease in Basra could not effectively be employed with the available personnel owing to the large tract of country involved; and that active operations were being carried out in highly malarious districts round about Baghdad, although Baghdad itself is comparatively immune.

In China the infection was chiefly acquired during the occupation of Kowloon City Musketry Camp, owing to the proximity of Chinese dwellings containing infected inhabitants. The occupation of the camp in 1923 was postponed until mid-December, but notwithstanding this precaution it was found necessary to close the camp owing to the number of severe primary infections occurring. Mosquito nets, although used in barracks, were not available for camp.

In Malaya the majority of the cases resulted from a detachment going to Taiping for musketry and failing to use mosquito nets. Steps have been taken to prevent a recurrence of this, and other anti-malarial measures have also been put in force.

In Mauritius all the cases contracted the infection at Fort George during training or detachment duty. The marshy area in the vicinity is now being dealt with by the civil authorities. In Turkey, the considerable movement of troops following on the disturbance was a factor in maintaining a high admission rate for the year. So long as a force is stationary in selected areas the occurrence of primary malaria may be checked, as was the case in Turkey before reinforcements arrived. The outstanding feature of the malarial distribution in this area was the almost complete immunity of Constantinople and its immediate neighbourhood. With the occupation of Gallipoli, the bridge heads on the Maritza, Rodosto and the south-west corner of Eastern Thrace, elaborate precautions were taken to protect the troops. No primary cases occurred on the Maritza, but a small outbreak of subtertian occurred in south-west Thrace on comparatively high ground and caused two deaths. It was suggested that these cases had been infected by mosquitoes which had survived the winter.

In Egypt, as potential factors necessary for an outbreak are present in most of the military stations, comprehensive anti-malarial schemes with maps were drawn up in anticipation of the malarial season. It was only by the exercise of constant anti-malarial vigilance that severe outbreaks were prevented.

In analysing the returns there is great difficulty in separating primary from recurrent malaria. In the home commands, the Rhine, Gibraltar and Malta, it may be taken for granted that all admissions (384) were relapses, but it is not always possible to differentiate the cases in stations where the disease is endemic.

From the records available it is estimated that out of a total of 2,283 cases (India excluded), 1,274 were benign tertian, 153 subtertian, 10 quartan and 846 are unspecified.

In other words benign tertian parasites were present in 55.8 per cent., subtertian in 6.7 per cent., quartan in 0.4 per cent., and only clinical evidence was forthcoming in 37.1 per cent.

Treatment of Malaria.—Apart from preventive measures it is possible to reduce the inefficiency caused by this disease by more carefully organised treatment, and good work is being done by the supervision of convalescents and the carrying out of anti-relapse

treatment, although an efficient and standard treatment for primary malaria has still to be discovered.

In many areas regiments transferred from a malarious district to another station are being thoroughly overhauled, and individuals showing signs of anaemia or enlarged spleen or with records of previous malaria are being placed under supervision and anti-relapse treatment.

As regards the treatment of relapses, the judicious use of arsenic alternately with quinine is still the most effective method. Quinidine, as tried at the Royal Herbert Hospital, Woolwich, has proved to be, if anything, less satisfactory than quinine.

Pneumonia.—There were 666 admissions for pneumonia, a ratio of 3.5 per 1,000 compared with 4.2 and 2.8 for 1922 and 1913 respectively. 352 cases were lobar and 133 lobular. The percentage of deaths to admissions was 8.56 for the whole army and 10.51 for the Home commands. It would appear that the type of pneumonia in the East is not so fatal as that at Home. In India, for instance, the percentage of deaths was 7.38 in 244 cases. The highest death rate occurred in the Southern Command—26.3 per cent. (10 in 38). A high death rate is also recorded in the Rhine—16.28 per cent. (7 in 43), and it is noted that 21 admissions and 5 deaths (23.8 per cent.) occurred in the first three months of the year and the majority of them were of the influenzal type.

In Egypt the incidence fell from 8.6 per 1,000 of strength in 1922 to 4.2 in 1923.

In 1922 it was suspected that prolonged exposure of men while bathing in the swimming-baths had an important bearing on the causation, and this appears to be confirmed by the fall of over 50 per cent. in the incidence in 1923, when special orders were in force as to the length of time men were allowed in the baths, and when instructions were also issued in regard to the sanitary care of the baths.

The incidence of influenza in the two years was practically identical.

A small series of cases of lobar pneumonia admitted during the year to the Queen Alexandra Military Hospital in London gave opportunity for the trial of samples of therapeutic anti-pneumococcus serum, Type I, on cases ascertained by the usual bacteriological technique employed for isolation and typing, to be infected by the homologous type (type I) of the pneumococcus.

A preliminary intravenous injection of a few c.c.s. of the serum was first administered to ascertain whether the patient could tolerate the introduction of a large dose of a foreign serum into his circulation. If there were no contra-indications, a dose of 100 c.c.s. of the serum combined with an equal part of a 5 per cent. solution of glucose to which a small quantity of a weak solution of calcium chloride and hyposulphite of soda had been added was then slowly injected into a vein.

The clinical results of this treatment were very favourable, but it is obvious that its application is limited by the facilities for expert bacteriological investigation and for the chemical preparation of the therapeutic solutions.

Sandfly Fever.—During late spring and summer this disease is a serious cause of sickness among our troops in the East. Infection with sandfly fever lowers a soldier's resistance to other diseases and breaks down his tolerance of certain pathogenic organisms especially protozoal parasites. The virulence of the disease increases by passage, as is shown by the incubation period, which is 14 to 15 days at the beginning of the season, but only 5 days later on in the summer.

The loss of efficiency due to sandfly fever cannot be measured by the number of admissions to hospital, as a large percentage of cases are treated outside. There has been an increase in the incidence since last year and compared with 1913 it has more than doubled.

The preventive measures directed towards the extinction of the Phlebotomus, which are indicated by the work of the Royal Air Force Commission on the bio-nomics of the fly, are difficult of application and their success is largely determined by the physical features

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of the occupied area and above all by the military situation.

So far it has been possible to apply the following measures only:—

All barracks, messes and married quarters have been cleared of ivy and creepers.

Accumulations of rubbish within 30 yards of barracks have been removed. All walls within the same radius have been repaired and pointed.

The highest rates of incidence were as follows:—

	No. of Admissions.	Ratio per 1,000.	Ratio per 1,000 for 1922.
Iraq	600	302.3	205.2
Turkey	1,205	104.2	82.5
Egypt	501	47.8	39.4
India	1,803	28.6	28.9
Malta	53	27.0	27.0

In Iraq any concentration of troops in the Hinaidi area near Baghdad is sure to be followed by a high incidence of sandfly fever, whereas at Basra the incidence is comparatively low. This distribution is the reverse of that for malaria.

In Turkey the old barracks in Constantinople and the Nightingale barracks at Chanak were veritable sandfly traps, and it became the practice to evacuate these old buildings on the approach of the sand-fly season and place troops under canvas. This, of course, could not be done in every case, but the immunity enjoyed by troops under canvas away from buildings and inhabited areas was noticeable.

In Egypt there seems to be a close association between the incidence of sandfly fever and pyrexia of uncertain origin. The latter has been steadily disappearing from the statistical returns, and in all the above-mentioned commands except Egypt the number of cases recorded was almost negligible.

Sand-fly nets have been issued to the Imtarfa Military Hospital and to the Military Families' Hospital in Malta, and it is hoped that their usefulness will be demonstrated during the ensuing hot weather.

In many cases various attempts were made to isolate a causal organism by blood culture and by animal inoculation, but all with negative results.

Microscopical examination of the blood in this disease showed no constant blood picture; it was usual, however, in cases that presented typical clinical symptoms, to find leucopenia with a relative increase of the mononuclear cells, but there were many cases diagnosed sandfly fever in which an early leucocytosis was found. There is therefore no method yet available for confirming in the laboratory a clinical diagnosis of sandfly fever.

Small-pox.—Owing to the prevalence of small-pox in the civil community in different counties in the United Kingdom, a special crusade was carried out in the regular army with the object of persuading all ranks who were not efficiently protected by vaccination to submit to vaccination or revaccination; as a result 3,277 primary and 41,431 revaccinations were performed on recruits and soldiers in the United Kingdom, and in permanent stations other than India.

A ready response was also given by the officers, women and children.

Special instructions were issued in July with the object of safeguarding soldiers of the Territorial Army about to proceed to their annual training camps.

It is gratifying to report that as a result of these precautions no single case of small-pox occurred in the United Kingdom.

Of the 30 cases reported, 14 were in India, 13 in Turkey, and 3 on board ship en route from India.

Tuberculosis.—A brief review of the situation as regards this constant cause of wastage proves interesting.

During the ten years before the Great War the admission rate for tuberculosis showed a steady fall from 2.4 in 1904 (pulmonary tuberculosis 1.3) to 1.7 in 1913 (pulmonary tuberculosis 1.3). In 1921 there was a set-back and the admission rate rose to 2.0

(pulmonary 1.6). The figures for 1923 show that the lost ground has been practically recovered and an interesting feature is that the variation during the whole of the period since 1904 has been entirely in pulmonary tuberculosis, the figures for "other" tuberculosis varying only by 1 in 10,000.

It is considered that the relapse in 1921 was an effect of the war combined with the strain placed on the recruiting machinery in the immediate post-war period. There is no doubt that the recruits forthcoming immediately after the war were not of the same physical standard as before, and the following recruiting statistics are of interest, though figures for the critical year 1919-20 are not available.

TABLE 4.
REJECTIONS FOR TUBERCULOSIS—RATES PER 1,000 EXAMINED.

	1911-12	1912-13	1920-21	1921-22	1922-23
Lung	0.98	1.02	1.78	1.42	1.18
Other	0.66	1.12	2.86	1.89	1.96
Total	1.64	2.14	4.64	3.31	3.14

It is evident that tuberculosis in the army must bear close relation to the standard of medical recruiting. The above figures sufficiently indicate that the problem of recruiting after the war was one of real difficulty which was reflected in the general health of the army and that so far as tuberculosis was concerned it was only the vigilance of the recruiting medical officers that prevented a very considerable increase in its incidence in the army.

Veneral Diseases.—The ratio of admissions for venereal diseases for the combined strength of home commands was, during 1923, 27.4 per 1,000, as compared with 40.3 per 1,000 in 1921, and 35.4 per 1,000 in 1922.

For commands abroad, excluding India, the combined ratio was 96.9 per 1,000 as compared with 114.8 in 1921 and 136.0 in 1922.

In India the ratio per 1,000 of the total garrison was 71.3 for 1923, compared with 110.4 in 1921 and 84.7 in 1922.

As the armies of occupation on the Rhine and in Turkey were serving in circumstances conducive to a high incidence of venereal disease, it may be of interest to quote separately the figures for these garrisons. They are as follows:—

Admission ratios per 1,000 of the strength.

	1921	1922	1923
Rhine	169.2	254.2	136.3
Turkey	228.5	88.8	87.1

The high incidence of venereal diseases in the Rhine Army during 1921 and 1922 was largely attributable to the exceptional economic conditions.

A substantial drop in the value of the pound sterling during 1923 and the improvement of industrial employment in Germany was followed by a considerable reduction in the incidence of venereal disease. There can be no doubt, however, that the energetic prosecution of anti-venereal propaganda and preventive measures by all military departments interested in the problem was an essential factor contributing to the fall in the incidence of these diseases during 1923.

As regards the army of occupation in Turkey the admission ratio per 1,000 of the strength for venereal diseases fell from 88.8 in 1922 to 87.1 in 1923.

The continued decrease throughout the army in the incidence of venereal diseases is attributable to many factors, of which the following are believed to be mainly contributory:—

(a) The improvement in depôts and units of regimental institutions for the provision of wholesome outdoor and indoor recreations for the young soldier.

(b) The increase of temperance in the use of alcoholic beverages.

(c) The improved treatment of venereal diseases, especially of syphilis, by which the number of infective persons is reduced.

(d) The spread, by organised propaganda, of information regarding venereal diseases.

(e) The provision of preventive outfits and facilities for disinfection.

Analysis of the figures for venereal disease again indicates that the fall in incidence was influenced by the continued reduction of admissions for syphilis as compared with the number of admissions for gonorrhœa.

Admission ratio per 1,000 for the whole army.

	1922.	1923.
Gonorrhœa	46.8	39.3
Soft Chancre	12.0	8.9
Syphilis	11.9	8.2

It would appear, therefore, that modern preventive and curative treatment is more successful as regards syphilis than gonorrhœa, and that further improvements in methods of combating the latter disease are necessary.

Venereal Diseases Hospitals.—These diseases are now treated in special sections of the general military hospitals, an arrangement whereby considerable economy has been effected. In July, 1923, the Military Hospital, Rochester Row, which for many years had been carried on as a special venereal diseases clinic and teaching institution for officers specialising in these diseases, was closed and the clinic was transferred to Woolwich and established in the Royal Herbert Hospital.

Diseases of Eye.—The standard of visual acuity laid down for the soldier has undergone frequent changes during the last 20 years. The necessity for getting sufficient recruits led to a general lowering of the standard, and the increasing demands made on the soldier led again to some elevation in the standard of visual acuity required.

During the period under review, 2,286 men, being a ratio of 38.94 per 1,000, were rejected on account of defective vision on presenting themselves for enlistment, and a further 132 men were discharged with less than 6 months' service for the same reason.

Middle Ear Disease.—At the head of the list of diseases which cause the greatest amount of invaliding comes suppurative conditions of the middle ear which accounted for 323 discharges, and simple inflammation of the middle ear ranks fifth on the list with 128 discharges. The loss of nearly half a regiment of men from one cause gives rise to serious consideration. Undoubtedly many of these are sequelæ of influenza or a recrudescence of old conditions which have escaped detection on enlistment, although a very large number are weeded out by the examining medical officer, as is shown by the fact that in 1923, 1,452 were rejected on examination for enlistment and 374 disposed of with less than 6 months' service.

While the results of treatment give relief in many cases, unfortunately relapses are only too common, and a man with a chronic discharging ear, apart from any interference with acuity of hearing he may have, is not considered a satisfactory soldier.

A steady reduction in the incidence of the cases originating during the period of army service may be looked for as a result of the more thorough examination of candidates for enlistment, the careful surgical attention to diseases of the nose and throat, such as tonsillitis and adenoids, and the number of officers who are now specially trained in this branch of surgery and doing good work.

The question of radical mastoid operations for the cure of suppurative conditions of the middle ear is not generally indicated in the army, for although very successful in civil life, in military life it often fails, owing to the loss of acuity in hearing, which is in itself sufficient to render a soldier unfit for further service.

Disease of the Heart.—Cardiac disease is as important as pulmonary tuberculosis as a cause of invaliding.

Disordered action of the heart accounted for 173 invalids, and valvular disease for 90, together giving a ratio of 1.37 invalids per 1,000 of the strength. To this, however, must be added a number of cases included under other diseases of the circulatory system.

A history of rheumatic fever, rheumatism, articular rheumatism or myalgia, either before or after enlistment, was a feature in the majority of cases. It is interesting to note that the command with the highest admission rate for valvular disease of the heart is also high for rheumatic fever.

As regards other causes of endocarditis, malignant and infective endocarditis have been fairly common. The gonococcus, *B. pfeifferi*, pneumococcus and streptococci were causal agents in certain cases.

Unless there is very good reason, all cases definitely diagnosed valvular disease of the heart are forthwith discharged as invalids.

Disordered Action of the Heart.—There were 847 admissions and 173 invalids discharged for this disability; high figures when compared with those for 1913 but a very definite improvement on 1921 and 1922.

Other Cardiac Affections.—Particular attention has been drawn to the cardiac sequelæ of influenza. Apart from its tendency to produce a type of disordered action of the heart and malignant endocarditis (fortunately rare) it is a common cause of myocarditis and dilatation. Hence special care during convalescence from this disease has been emphasised.

Tonsillitis.—This disease provides the third highest admission rate, with 5,566 admissions and a ratio of 29.0 per 1,000. For the years 1922 and 1921 the admissions were 5,516 and 7,684, with ratios of 26.5 and 32.1 respectively. In 1913 the corresponding figures were 4,774 and 22.7.

Being a debilitating disease and entailing a somewhat prolonged stay in hospital, it also comes high in the list of average constantly sick, being fourth with 174.68.

As a cause of inefficiency, therefore, it ranks high, and its universal distribution, irrespective of climate, is shown by referring to the incidence rates at the various stations.

Owing to the widespread inefficiency attributed to tonsillitis a special investigation was instituted with the object of ascertaining the cause or causes of the trouble. Apart from any microbic origin, the following factors appear to have a considerable bearing on the incidence in different stations:—

(i) Excess of dust, in the barrack rooms or elsewhere. This appears to be most closely associated with the prevalence of the disease.

(ii) Insufficient accommodation in certain barrack rooms, particularly in regard to floor and wall space, which undoubtedly facilitates spread of the disease. Such defects are being remedied where possible, but it is sometimes impossible in old barrack rooms, owing to their construction.

(iii) In one station, owing to the absence of drill sheds, barrack rooms were used for instructional purposes in inclement weather. This was considered to be responsible for the high incidence of the disease, as a hot, humid, vitiated atmosphere, laden with dust and excess of organic matter, was produced, and Professor Leonard Hill has shown that such conditions readily produce congestion, swelling, and infection of the mucous membrane of the nose and throat. The provision of drill sheds for this station is receiving attention.

(iv) In the Army of the Rhine the high incidence in the summer months was attributed to the predisposing effects of the escape of sewer gas from the defective drainage systems in existence in that country.

Beyond the fact that its spread is favoured by proximity, dust and bad ventilation, the ætiology of this disease is still a matter for conjecture. As stated, it is often attributed to dust, but in Turkey it was prevalent during the wet season among troops under canvas.

The following are notes from the section of the report dealing with the special departments:—

I. *Medicine*.—In 1922 the appointment of a consulting physician to the army was authorised, and medicine was added to the list of subjects in which officers could specialise. Encouragement was thus given to medical officers to specialise in the practice of medicine and the investigation of disease.

In comparison with recent years there has been a distinct falling off in the number and variety of tropical cases under treatment at Home. No doubt this is due to the large number of young soldiers now serving and to the fact that the Ministry of Pensions is responsible for the treatment of pensioners. Very little of tropical interest was brought back by the troops evacuating Turkey, and the sick convoys from India very largely consisted of young debilitated soldiers suffering from disordered action of the heart and neurasthenia.

The treatment of relapsing amoebic dysentery has been greatly improved upon by the introduction of *Stovarsol*. This drug has been given a trial at Woolwich and Millbank, and has, so far, stood the test well. A course of 4-grain tablets t.i.d. for a month is consequently recommended in chronic cases. It has the advantage of simplicity of administration and does not cause nausea or disturb the digestion; furthermore its arsenic content has a valuable tonic action. Its value in the acute stage of the disease has been proved in one very severe case, which was entirely refractory to emetine and which would certainly have died. The immediate and rapid improvement in this case was most striking.

The treatment of *sprue* has been carried out with success. The calcium and parathyroid treatment is combined with the main treatment, in a dietary the basis of which is milk, carefully graduated to suit each individual case and supplemented, and this is most important, by vitamin-containing foods and preparations such as oranges, lemons and marmite.

A number of cases of *oriental sore* have as usual been forthcoming. The treatment recommended in cases with multiple sores or with sores on the face which may disfigure, is the intravenous injection of antimony tartrate.

The treatment of the chronic cases of *bronchitis* and *asthma* is unsatisfactory, but in certain patients considerable success was achieved by the use of autogenous vaccines.

The type of *asthma* usually met with is the result of sensitivity to a bacterial protein, and steps have been taken to make available for medical specialists a set of diagnostic protein extracts for use in special cases.

The treatment of *kidney diseases* is, within certain limits, now carried out in accordance with the most modern teaching, and is controlled by blood and urine tests. Facilities for the estimation of urea in the blood for the present exist only in those hospitals with medical specialists, but are to be extended. Kidney function tests such as the urea concentration test are easy of application and medical specialists are encouraged to carry them out in all cases in which damage to the kidney function is suspected, as they have an important bearing on the question of invaliding.

Urea sulphate has been used in the treatment of hydræmic cases with success, and two cases of chronic parenchymatous inflammation were operated on and decapsulation of the kidneys performed with good results.

The treatment of *diabetes* with insulin, controlled with blood tests, has been placed entirely in the hands of medical specialists for the time being. The practice is, once a man is definitely proved by blood and urine examination to be suffering from true diabetes, to bring him before an invaliding board and, pending his discharge, to work out his carbohydrate tolerance. He is gradually worked up on Allen's diets till he is taking a diet of the required caloric value and the minimum dose of insulin required to keep him sugar free is administered if necessary. Thus, when the soldier is discharged from hospital he has a complete record of

his case with a statement of the treatment it is necessary for him to continue.

Renal glycosuria has been found in several cases; all were officers. As a rule the condition was found more or less accidentally, though usually there was the complaint of a breakdown in health with indefinite symptoms. The non-service view is that this condition does not constitute a disability.

In the army it has been found that these cases tend to break down under strain and on foreign service and that the condition indicates or is associated with what may be termed a lack of stamina. Therefore, a very careful investigation is carried out in each individual case.

The differential diagnosis of nervous diseases constitutes an important part of the medical specialist's work, for it is in this branch of medicine, more than in any other, that medical officers welcome assistance.

A committee was appointed by the War Office to investigate the subject of *disordered action of the heart*.

After studying the literature and analysing the experience gained during the Great War, the committee decided to deal with the question from the two points of view, (a) recruiting, and (b) disposal after admission to hospital.

It soon became clear that cases of disordered action of the heart could be placed in two main groups: (1) those in which there was evidence that the disability existed before enlistment, and (2) those in which it had developed after enlistment. The first group provided a large proportion of the cases.

It was hoped that by means of a simple form of exercise tolerance test which could readily be put into operation in the recruiting office, in addition to the observance of the recognised stigmata of vasomotor instability, it would be possible to eliminate the first group. A series of experimental tests was carried out on selected groups of men in order to find a simple test and obtain a normal response before the selected test was applied to known cases of the disease. While there was no doubt that the cases of disordered action of the heart gave an abnormal response, it became obvious that an abnormal response within limits did not necessarily mean a cardiac disability or that the individual was unable to perform the duties of a soldier.

The committee decided to make further experiments, as they were not in a position to lay down any hard and fast rules for standard tests for disordered action of the heart for fear of a too literal interpretation leading to the exclusion of satisfactory recruits.

Instructions were then issued for the examination of a series of 500 recruits on enlistment, after three months' service and at the end of their period of training. The nature of the examination and the standard test to be employed were carefully specified. It is hoped that the information forthcoming from this test will be of material assistance.

As regards the second group, those developing disordered action of the heart in the course of military service, it was recognised that the condition might be the result of infections, such as influenza, pneumonia, tubercle, septic foci, teeth, etc., or of debilitating diseases, such as malaria and dysentery and hyperthyroidism. The medical specialists were instructed to make a study of each case from the point of view of aetiology and treatment and to submit reports. These reports are being considered and the views expressed will be embodied in the report of the committee.

A point on which the committee is clear is that the term *disordered action of the heart* is one that lends itself to abuse, and no doubt they will make recommendations on this point.

II. *Surgery*.—The general effect of the South African War was to show that it was disease which was to be feared in war and that wound casualties were relatively unimportant. Wounds caused by rifle bullets in South Africa, if not immediately fatal, usually healed well and serious septic complications were the exception. While the work of elucidating the problems of disease and their prevention was fostered, the surgical work

of the army medical officer came to be looked upon as of relatively small importance. Good work was, however, done by many officers, and steady progress in the art of surgery had continued up till 1914.

The Great War, with its concentrated rifle and machine-gun fire, and the multiplication and greater destructive effect of modern artillery and other weapons of offence, together with the invariable infection of the wound as a result of the terrain over which hostilities took place, soon showed that surgery was again of overwhelming importance in war.

Unfortunately for the regular officer of the Royal Army Medical Corps, his special training in corps and administrative duties necessitated his employment in this way during the war, and only a small number of officers had the opportunity of engaging in actual surgical work, which was carried on during the war by the civilian surgeons who had joined the army.

As can be imagined, the effect on the surgical personnel of the corps when the army returned to a peace basis, was to leave but few surgeons of experience. Most of those who had been the surgical specialists in the pre-war days were now senior administrative officers, and the problem arose of training a new band of surgeons to carry on the surgery of the army in peace, as an officer must first be a good general surgeon in peace if he is to be a good military surgeon in war.

Every officer of the corps is instructed in the problems that are peculiar to surgery in the field, both on first joining, and again when he comes up for his senior course at the Royal Army Medical College for promotion to the rank of major. From those who pass the latter course certain officers who have gained a high place in their examination and have shown surgical abilities are retained for a further course of special surgical training.

This training is carried out both at the Royal Army Medical College and in selected civilian London hospitals. The standard of knowledge aimed at is a high one and is based on the training for the Fellowship of the Royal College of Surgeons in England. In fact, officers usually attend the special courses for this qualification at one or other of the London civilian hospitals.

What has already been said about the surgical specialist applies equally to all the other professional branches associated with surgery, *viz.*, pathology, ophthalmology, x-rays and electro-therapeutics, ear, nose and throat, gynecology and anaesthetics.

In all these branches, specially selected officers have been trained at the Royal Army Medical College and at selected civilian hospitals, and all who are employed have raised the standard of treatment in their commands.

During the year, attention was directed to the meagre operating outfit supplied on Indian transports, and arrangements have now been made for 12 specially prepared operating outfits contained in hermetically sealed tins to be supplied on each of these transports. Some additions have also been made to the surgical instruments carried on these ships.

Generally speaking, the year has shown an awakened and progressive interest in surgery, which, if maintained and fostered, promises in course of time a lessening of mortality, invaliding, and inefficiency from surgical conditions, and a more efficient surgical staff and equipment for mobilization.

It is of great importance for the army surgeon to maintain close touch with the civilian surgeon, and great benefit is derived by all officers from the various clinics who attended in the London hospitals while undergoing instruction at the Royal Army Medical College.

III. *Hygiene.* Accommodation.—Owing to the fact that no money was spent during the Great War in keeping the permanent barracks, hospitals and married quarters at home and abroad up to date, and owing to the redistribution of troops necessitated by the loss of the barracks in Southern Ireland, by military contingencies abroad, and by the formation of new units, it will be many years before all garrisons are provided with accommodation which is up to modern standards.

Very considerable leeway, however, has been made up since the war and much has been and is being done as money becomes available to remedy the graver defects.

Among the many important sanitary problems dealt with in different commands throughout the year special mention may be made of the mosquito surveys and schemes for the destruction of mosquitoes in Aldershot, Gosport, Bermuda, Ceylon, Egypt and Jamaica.

In Egypt, Ceylon and Jamaica, the great danger from mosquitoes was malaria, but in Bermuda the importation of yellow fever was feared, and in Aldershot and Gosport septic sores were resulting from the mosquito bites.

The majority of the schemes were on the usual lines, but an interesting feature was observed in Bermuda in connection with the use of fish for getting rid of larvæ. It was found that mullet would eat only the small larvæ while goldfish devoured larvæ of all sizes indiscriminately. The lesson to be learnt from this is that if mullet have to be used they should be put into the tanks or other breeding places before the larvæ have begun to appear.

Special steps were also taken in Egypt, Malta and elsewhere to deal with *Phlebotomus papatasi*, bug-infested barracks, and fly prevalence.

Health of the British Army in India.

Turning to the special section of the report dealing with the British Army in India, the admission rate for officers was 597 per mille, the chief cause being malaria; that for soldiers was 595 per mille, the chief diseases being malaria, gonorrhœa, sandfly fever and tonsillitis; the low incidence of syphilis is noteworthy. The death rate was 3.85 per mille, and the invaliding rate 15.51 per mille. Biting insects are a most important factor in causing disease in the army in India, since malaria, sandfly fever and dengue are of such special importance. The Western Command, owing to its comparative freedom from insect-borne disease had the lowest admission rate, while the north of India, comprising the Northern Command and the Waziristan district shewed the greatest number of admissions for insect-borne diseases. Lahore had a severe epidemic of malaria, and Calcutta a severe one of dengue. Peshawar had an admission rate of 890.8 per mille, of which malaria was responsible for 479.4 per mille. In Calcutta the admission rate for venereal diseases was 183.4 per mille as against a rate of 144.7 per mille for malaria.

Of the principal diseases dysentery accounted for an admission rate of 13.2 per mille. The enteric fevers are now unimportant, with an admission rate of only 2.3 per mille; as 95 per cent. of troops are protected by inoculation.

Malaria was the cause of 172.2 admissions per 1,000 of the strength, compared with 175.4 in 1922. This disease is still the outstanding cause of admissions to hospital in India. Comparatively good years give place to bad ones and these again to better years. It would seem therefore that the fluctuations are almost unaffected by the preventive measures so far adopted.

Officers, women and children do not acquire the infection to the same extent as other ranks. This fact points to the high incidence among other ranks being dependent on some factor or factors that do not apply to the same extent in the case of officers, women and children.

Administrative measures have recently been adopted which, it is hoped, will lead to the collection of accurate data on the following points:—

- (1) The season of the year at which infection takes place.
- (2) The time of day at which infections take place.
- (3) The species of anopheline mosquito that spread the infection.
- (4) The breeding-places of these "vector" mosquitoes.
- (5) The exact place at which the patients acquire the infection.

It has now been thoroughly established that a person may live with immunity in the midst of intense malarial infection provided he is determined not to be bitten by mosquitoes and takes thorough precautions accordingly.

Prevention therefore depends very largely on the individual himself and on his determination, or otherwise, to ensure that he is not bitten by mosquitoes. This again depends partly on the education of the subject with regard to malaria and partly on the disciplinary measures in vogue.

Mosquito nets have now been made the property of the men themselves, but very close supervision is found to be necessary in order to ensure that they are effectively used.

Electric fans used in conjunction with nets are believed to ensure both comfort and protection. Motor-driven punkahs without nets are not considered to be effective as such punkahs are often noisy in use and when stopped for any reason the men are left without any protection whatever.

Some measure of protection is obtained by the use of repellents, and P.C. oil is provided and ordered to be used, especially by men on guard or other duties at night.

In certain places, such as the Ridge of Jubbulpore, where the problem is fairly clearly defined, anti-mosquito measures have been attended with a considerable degree of success. In other places, such as Lahore, Rawalpindi and Peshawar, it does not appear that the measures taken have had any appreciable effect on the incidence.

Waziristan, with an admission ratio of 585.2 per 1,000 still occupies the first place among malarious localities, the Northern Command being second with 343.8 per 1,000. These two together give an admission ratio of 464.5 per 1,000 as compared with 82.3 per 1,000 for the rest of India.

The six most malarious of the large stations were:—

	Per 1,000 admissions.
Lahore	1,077.1
Peshawar	479.4
Nowshera	385.2
Delhi	283.7
Rawalpindi	279.8
Sialkot	22.79

The malaria in Lahore was part of a severe epidemic which ravaged the Punjab during the autumn of 1923.

The conditions prevailing at Lahore Cantonment remain practically unchanged since the time when it held its evil reputation as "Mian Mir." An exceptionally healthy station for nine months of the year, Lahore becomes a hotbed of malarial infection during August, September and October.

During the monsoon, which lasts usually from mid-July to mid-September, *Anopheles rossi* appears in enormous numbers, to be followed by *Anopheles culicifacies* and *Anopheles stephensi* in smaller numbers.

Investigations show that *Anopheles rossi*, although not found infected in nature, becomes infected as readily as the other two under experimental conditions. Although doubtful as a vector of the malaria parasite, it is under grave suspicion, and instructions have been issued that for the purpose of anti-malarial measures it is to be considered a vector and dealt with accordingly.

It is interesting to record that Quetta does not appear in the table for the year under review.

The actual number of admissions for all India during 1923 was 10,875 of which 5,965 were instances of relapses.

84 per cent. of the cases were accurately diagnosed by microscopical examination of blood films, the remainder being diagnosed on clinical grounds.

Sand-fly Fever.—In the case of sand-fly fever the admission ratio per 1,000 was 28.6, practically the same as in 1922.

The distribution of the cases by commands was:—

	Admissions to hospital.	Ratio per 1,000 of strength.
Northern Command ..	1,126	68.1
Western Command ..	15	2.8
Eastern Command ..	359	21.4
Southern Command ..	89	4.8
Waziristan District ..	96	47.8
Aden Brigade ..	111	94.5
Troops on the line of march ..	7	28.5
All India ..	1,803	28.6

As was the case in 1922, the highest ratio of admissions to hospital in India proper occurred in the Northern Command and Waziristan District.

Dengue.—The total number of admissions to hospital for dengue was 994, with a ratio of 15.7 per 1,000, compared with 13.5 in 1922. The commands chiefly affected were:—

	Admissions to hospital.	Ratio per 1,000 of strength.
Eastern Command ..	507	30.2
Southern Command ..	238	12.7
Burma District ..	224	112.0

The distribution points to strictly local conditions being responsible, and these correspond with the known domestic habits of the mosquito vector, *Aedes calopus*.

Small-pox contributed only 14 admissions to hospital, against 25 in 1922.

Pulmonary tuberculosis showed 70 admissions during the year as compared with 51 in 1922, while the numbers of deaths were 9 and 11 respectively.

Veneral diseases.—The ratio per 1,000 admissions to hospital for venereal diseases has decreased from 84.7 in 1922 to 71.3 for 1923. The important factors which probably assist in maintaining the general decrease in admissions to hospital for venereal diseases are:—

(1). Increased efficiency and use of prophylactic treatment rooms.

(2). Improved education of all ranks as regards knowledge of venereal diseases and the dangers of over-indulgence in alcohol.

(3). Other prophylactic measures, e.g., the use of preventive packets. These satisfactory results are only attained when the medical service is assisted by regimental officers taking a greater interest in their men, and by units organising more attractive regimental institutes, clubs and the other social activities which foster a strong sense of *esprit de corps*, and prove a counter attraction to the cheap and gaudy fascinations of the bazaars.

For the three years, 1911, 1912, 1913 (the three consecutive years showing the lowest venereal disease ratios among British troops in India from 1861 to 1914) the average ratio of syphilis to gonorrhoea among British troops was 1 to 2.9, while that among Indian troops for the same period was 1 to 1.4.

For the three years, 1894, 1895, 1896 (the three worst years) the British average ratio was 1 to 0.75 (nearly), and that for the Indian troops was 1 to 0.64.

It is evident from these figures that the ratio of syphilis to gonorrhoea in India is not the same as that in Europe, but approaches the 1 to 1 ratio.

In Europe the ratio of syphilis to gonorrhoea is usually taken as being 1 to 3 or 4, so that it might be argued that the British ratios given above are normal. It should, however, be noted that the ratio of syphilis to gonorrhoea has shown a yearly decrease since 1921, the date of improvement in organisation, equipping and more general use of prophylactic treatment rooms. Again, if the ratio of syphilis to gonorrhoea among Indian troops (1 to 1.0) be taken as the normal ratio of these diseases in India, then it is permissible to deduce that there is some factor operating among the British but not among the Indian troops, which should account for the striking difference in the ratios.

The fact that the incidence of venereal diseases among the civilian population is very high cannot be disputed,

and it is needless to expect low incidences of these diseases among soldiers in India, while *pari passu* there is an ever increasing incidence among civilians, for which nothing is being done.

The examinations carried out at the Central Dermatological Laboratory, Poona, during 1923, were:—

Wassermann tests	16,833
Sachs Georgi tests	1,714
Greyer Ward tests	9
Microscopical examinations	517
Total	19,073

This laboratory carries out all Wassermann tests and research work in connection with venereology for both the British and Indian armies in India; it also forms a centre for research and instruction in everything pertaining to the modern investigation and control of venereal diseases, while in conjunction with the venereal section of the British Station Hospital, Poona, it functions as a teaching centre for junior officers of the Royal Army Medical Corps and Indian Medical Service, and for assistant and sub-assistant surgeons.

* * * * *

In conclusion, in reviewing this valuable report, it is quite clear that the greatest enemy of the British Army throughout the wide Empire in which it serves is *insect-borne disease*. During the Great War the Royal Army Medical Corps made immense and notable contributions to surgery, especially operative and orthopaedic surgery; during peace time we trust that it will make contributions of equal importance to the greatest problem of preventive medicine in the tropics,—the prevention of insect-borne disease.

Correspondence.

THE CHOICE OF QUININE SALTS FOR INJECTION IN MALARIA.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—On p. 33 of the January 1926 issue of the *Indian Medical Gazette*, Sir Leonard Rogers is reported to advocate in general the use of quinine by the mouth in malaria, cinchonine b. hydrochloride intramuscularly, and for special cases the use of the soluble quinine salts intravenously. I write to ask whether any of your readers can from experience advise me as to the use of either quinine hydrobromide or quinine acid hydrobromide by injection in cases of malaria where vomiting prevents the oral administration of quinine—the pernicious type of malaria. The latter salt is stated to be the best salt for hypodermic (? subcutaneous) injection and to be non-irritant. Is either of these safe and suitable for subcutaneous use? If given subcutaneously, intramuscularly, or intravenously, what dose should be given for an adult, and in what dilution by each method?

Further, would 15 grains of quinine-urea be safe for injection by either of these three routes in 10 c.c. of saline, for an adult suffering from malignant malaria? To my mind it appears to be the safest preparation for intramuscular and subcutaneous injection in these cases, but I hesitate to use it without further information.—Yours, etc.,

J. F. LEONARD CHINAL, M.B., D.T.M. (Bengal).

MONCHYR,
14th March, 1926.

[Note.—Our correspondent will find in the *Indian Journal of Medical Research*, 1918, Vol. V, p. 463, an article by Knowles dealing with the intravenous administration of quinine acid hydrobromide as a routine treatment for malaria. In all, 139 such injections were given to 28 patients; the dosage given being a daily injection of from 7 to 10 c.c. of a 5-per cent. solution. The method was tried on patients of ages ranging from 10 to 55 years, and in cases of advanced pregnancy and severe dysmenorrhœa, without causing any

symptoms of distress. The immediate effect of such injections is admirable, and the method is of special value in pernicious malaria; but it has to be subsequently supplemented by oral administration of quinine, as it fails to sterilise the patient of parasites.

Cinchonine bihydrochloride was originally recommended by Sir Leonard Rogers for intramuscular use, under the impression that it was less painful and less irritant to the tissues than the salts of quinine. It has been shown by Acton and Chopra, however, (*Indian Journal of Medical Research*, 1924, Vol. XII, p. 251), that "the salts of the four main alkaloids of cinchona bark all cause œdema, irritation and necrosis of the tissues. Cinchonine hydrochloride, when injected into the tissues, produces necrosis and œdema, and is the weakest alkaloid therapeutically." McCarrison has pointed out that quinine when given in large doses intravenously depresses the respiratory centre more gravely than the cardiac mechanism, and advised the use of the hydrobromide as less depressant. For subcutaneous and intramuscular injection, the hydrobromide is probably preferable to the other salts of quinine and to the use of cinchonine; the dose usually advocated is $7\frac{1}{2}$ to 10 grains in about 2 c.c. of saline. The acid hydrobromide of quinine is soluble in 7 parts of water and contains 60 per cent of quinine base.

Quinine-urea possesses the advantage of being painless, and indeed anæsthetic, on injection. Originally used in America for intramuscular injection in cases of malaria, it was this use of the drug that led to the discovery of its anæsthetic properties. It is soluble 1 in 1 part of water, and contains 59 per cent. of quinine base. One would not care to advocate a greater dosage by injection than 10 grains, however. As far as we know the drug has been but little used in malaria.

—Editor, INDIAN MEDICAL GAZETTE.]

A CASE OF IMPERFORATE HYMEN.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR,—An article on imperforate hymen in one of your recent issues reminds me of a similar case I saw in this city in company with a lady doctor about a week ago. She was a well-nourished girl of fourteen years with fairly well developed mammae. She complained of pain and a sense of heaviness in the lower part of the pelvis as well as back-ache. She could walk only with difficulty; had a little rise of temperature, and passed an uncomfortable night owing to pain. Micturition was frequent. This condition, curiously enough, recurred every month, for the last four months and coincided, so to say, with the menstrual period, nearly disappearing after five or six days. She gave a history of complete amenorrhœa. There was nothing wrong with her external genitalia. On examination a soft cyst-like protuberance could be seen occluding the entrance to the vaginal canal. A diagnosis of retained menses owing to imperforate hymen was made. After an enema the patient was put in the lithotomy position and the thick layer of the cyst-like tumour tapped in the centre with a trocar and cannula. About one and a half seers of retained thick, chocolate-coloured menstrual fluid rushed out, giving much relief to the girl. Then the puncture in the centre was enlarged with a blunt-pointed bistoury. The vaginal canal was washed out with lysol lotion and a piece of gauze placed in. She was put to bed after dressing, and made an uneventful recovery.—Yours, etc.,

A. BUTT, M.B., B.S., M.D. (Berlin),
Medical Officer,
Muslim University Hospital.

ALIGARH,
19th May, 1926.

APYREXIAL LOBAR PNEUMONIA.

To the Editor, "THE INDIAN MEDICAL GAZETTE."

SIR.—I was interested to read Captain C. C. Das Gupta's record of a case of apyrexial lobar pneumonia in a child three months old. I have not seen

Aug., 1926.]

cases in children, but it may be interesting to mention that such cases are occasionally met with in adults, in asylum practice, and I remember a few within my experience at the Punjab Lunatic Asylum, Lahore.

The cause may be due, as suggested, to some effect on or defect of the thermogenic centre.—Yours, etc.,

A. R. D'ABREU, I.M.B.,
Asst. to the Civil Surgeon, Lahore.

KACHERI ROAD, LAHORE,
18th May, 1926.

OBITUARY.

LIEUT.-GENL. SIR WILLIAM LEISHMAN, Kt.,
K.C.B., K.C.M.G., M.B., F.R.C.P., F.R.S., LL.D., K.H.P.,
Director-General, Army Medical Service.

THE scientific world, the medical profession and the Royal Army Medical Corps sustained a great loss when on June 2nd, of this year Sir William Leishman died after a short illness.

William Boog Leishman was born on November 6th, 1865; he was the son of Dr. William Leishman a professor of midwifery and obstetrics at the University of Glasgow. He was educated at Westminster School and later at Glasgow where he graduated in 1886. Immediately after this he joined the army as a surgeon and was sent out to India. He saw service in the Waziristan expedition of 1894-95. He returned to England in 1897 and was stationed at Netley; here he was associated with Sir Almroth Wright and Sir David Semple who were, respectively, professor and assistant professor of pathology at Netley. He succeeded Sir Almroth Wright as professor of pathology at Netley in 1903. Sir William held this appointment until 1913: during this period the Army Medical School was transferred to Millbank. On vacating this appointment he became the expert in tropical diseases on the Army Medical Advisory Board; this position he held throughout the great war, although his activities during this period were manifold. He was with the Expeditionary Force in France from October 1914 until April 1918 as adviser in pathology. He was recalled for duty at the War Office and was appointed director of pathology, a post which he held until July 1923 when he succeeded Sir John Goodwin as Director-General, Army Medical Service.

Although for the whole of his service Sir William was never seconded for duty outside the Royal Army Medical Corps, his individuality was never submerged in the routine of his long service in this Corps. If he was more fortunate than the average officer in his service in the nature of the duties that fell to his lot, this was due entirely to his own efforts. From the very beginning of his service he distinguished himself by taking a microscope out to India on his first tour of foreign duty. It was obvious that from this early date his interests turned towards pathology, and especially that connected with tropical medicine. His association with Wright at Netley played a very important part in the shaping of his career; it was here that he carried out the work which has associated his name indissolubly with certain tropical diseases.

In 1900 when examining sections of the spleen of a soldier who had died of a long continued fever which he contracted at Dum Dum he observed and made drawings of certain bodies which he had never observed before in spleen sections or elsewhere and which were also new to Wright to whom he showed the sections. Some years later he was struck by the similarity of these bodies to the trypanosomes observed in the organs of rats. In 1903 he published his earlier findings. The same organism was also observed about this time by Donovan, occurring in the spleens of cases of kala-azar in Madras. The true nature of this organism was shortly afterwards discovered when Rogers demonstrated its flagellate phase and the genus *Leishmania* was established by Ross. Despite the

numerous attempts to re-christen it, the causative organism of kala-azar is still known as *Leishmania donovani*, in all the more important scientific publications.

Leishman's special interest in the subject of technique is signified by his introduction of that universal stain for protozoa which also bears his name.

Another most important contribution to medical science was his share in the introduction of inoculation against typhoid. Although the original idea was not conceived by him, the great success of this prophylactic measure was to a very large extent due to his work on the subject and if the elimination of typhoid fever from the armies in the great war can be attributed to inoculation, it is certainly to Sir William Leishman that the thanks of the peoples of the British Empire are mainly due.

His ability as a teacher and his powers of organisation were fully demonstrated at the Royal Army Medical College at Netley and later in London.

It is impossible to do justice to him in recording his activities during the war. As adviser in pathology he was responsible for the equipment and organisation of the laboratories in France and anyone who wishes to see the results of the wonderful work that was carried out during these years should refer to that volume of the Medical History of the War which is devoted to pathology. As Director of Pathology he was responsible for the very thorough reorganisation which the laboratories of the Royal Army Medical Corps have undergone since the war. Sir William no doubt remembered his experience in India and he made up his mind that the young Royal Army Medical Corps man who was keen on pathology and research should receive as much encouragement as he himself doubtless received discouragement.

Finally his director-generalship of the Army Medical Services was as successful and popular as his appointment to this post had been inevitable.

Outside the Army Medical Service Leishman's appointments and responsibilities were also great and various. He was a member of the Yellow Fever Commission, West Africa (1913-15), and of the Medical and Sanitary Advisory Committee for Tropical Africa at the Colonial Office; he was for ten years a member of the Medical Research Council, vacating his seat on appointment as Director-General, he was a member of the Scientific Advisory Committee of the British Empire Cancer Campaign; quite recently he was appointed chairman of the Foot-and-Mouth Disease Research Committee of the Ministry of Agriculture; he was a past President of the Society of Tropical Medicine and Hygiene and had acted as examiner in pathology at Oxford and in tropical medicine at Cambridge. Just before his death he was elected President of the Section of Comparative Medicine at the Royal Society of Medicine, an appointment which shows alike that the wide range of his learning was appreciated by colleagues, and that his own desire was keen to remain actively associated with scientific work as far as the duties of his high official post would permit him to do so. His contributions to medical and scientific literature were numerous and particularly instructive as being personal records; these include the article on kala-azar in Allbutt and Rolleston's "System of Medicine."

In 1910 Leishman was elected a Fellow of the Royal Society, and served for two years as Vice-President. He was knighted in 1909, and in 1912, having just been promoted Colonel, he was appointed honorary physician to the King. He was created C.B. in 1915, K.C.M.G. in 1918, and K.C.B. in 1924, and was continually mentioned in dispatches during the European War; he was a Companion of the Legion of Honour and held the Distinguished Service Medal of the United States Army.

It is very rarely that Nature endows one man with the powers for scientific research which made the name of Leishman so universally respected in the scientific

world and the ability and powers of he displayed during his term of General and it is a great pity that she could not have seen her way to allow him a few more years during which to use these powers for the benefit of the Army Medical Services in particular and mankind in general.

L. E. N.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel C. B. McConaghy, I.M.S., an Agency Surgeon, on return from leave, is posted as Legation Surgeon, Nepal, and *ex-officio* Assistant to the British Envoy at the Court of Nepal, with effect from the 31st March, 1926.

With reference to Army Department notification No. 411, dated the 9th April, 1926, Captain T. A. Doran, I.M.S., is appointed to officiate as Executive Officer, Kirkee Cantonment, in addition to his ordinary duties, with effect from the 16th May, 1926, or from the date of assumption vice Captain F. R. Bailey granted privilege leave.

Captain R. L. Vance, I.M.S., Officer Commanding, Indian Station Hospital, Gyantse, is appointed to officiate as British Trade Agent, Gyantse and as British Trade Agent, Yatung, in addition to his other duties, with effect from the 1st June 1926, and until further orders.

The undermentioned gentleman to be temporary Lieutenant:—

Thaku Chuharmal Ramchandani, M.N. Dated 12th May, 1926.

LEAVE.

Major R. W. G. Hingston, M.C., I.M.S., Surgeon Naturalist, Marine Survey of India, was granted, with effect from the 26th March, 1926, privilege leave for 30 days combined with study leave for 8 months.

Major J. A. Sinton, V.C., O.B.E., I.M.S., Officiating Assistant Director, Central Research Institute, Kasauli, is granted leave on average pay for 8 months combined with leave on half average pay for 4 months, with effect from the afternoon of the 20th May, 1926.

Major R. B. Lloyd, M.B., I.M.S., Imperial Serologist, is granted leave on average pay for 6 weeks, with effect from the 11th May, 1926.

PROMOTIONS.

Colonel to be Major-General.

Francis Hope Grant Hutchinson, C.I.E., M.B., vice Major-General Thomas Henry Symons, C.S.I., O.B.E., with effect from the 1st April, 1926.

Major-General Hutchinson's tenure will reckon from this date.

Captains to be Majors.

William Peat Hogg, M.C. Dated 10th April, 1926.
Vaman Raghunath Mirajkar, F.R.C.S. Dated 5th May, 1926.

Mohamed Mossa Khan. Dated 26th May, 1926.
The promotion to the present rank of Major Har Gobind Lal Batra, M.C., notified in Army Department notification No. 1306, dated the 4th August, 1922, is antedated from 30th July 1922 to 30th January, 1922.

Temporary Lieutenants to be Temporary Captains.

Gurdat Singh Gill. Dated 20th June, 1926.
Lal Singh Anand. Dated 20th June, 1926.

RETIREMENTS.

Lieutenant-Colonel W. H. Tucker, I.M.S., on account of ill-health. 25th March, 1926.

Lieutenant-Colonel G. E. Stewart, M.B., F.R.C.S.E. 2nd May, 1926.

NOTE.

THE TWO "BOROCAINES."

On page 34 of our issue for January 1926, we gave an account of a new class of local anaesthetics, introduced as the result of experimental work at the Cambridge University Pharmacological Section by Drs. Copeland and Notton:—the "borocaines." The borocaines are borates of novocaine, and are remarkable in that their electrolytic dissociation is minimal, and hence their local anaesthetic action maximal. Unlike cocaine hydrochloride, which, being an acid salt, dissociates rapidly, the borocaines have a prolonged and powerful action. We noted at the time that, in order to ensure a standard and active product, the manufacture of the borocaines had been entrusted to the British Drug Houses, Ltd.

In a recent brochure from this firm, the history of the borocaines is carried a step further. Two of the borocaines, on experimental investigation, stand out pre-eminent; *viz.*, ethocaine borate—now known as "Borocaine," and benzamine borate—or "Beta-Borocaine." Both are stable white crystalline powders, freely soluble in cold water, Ringer's solution, and normal saline. The solution of "Beta-Borocaine" can be boiled for five minutes without reduction of efficiency, but "Borocaine" solution cannot withstand boiling for more than a few moments. Of the two, "Borocaine" is in general non-irritant and non-toxic and an ideal local anaesthetic for all minor and surgical and dental operations requiring injections. Beta-Borocaine however is very much stronger and is especially the local anaesthetic for eye work—in a 0.25 per cent. solution; and for anaesthetising mucous membranes such as in urethroscopy and in all surface skin work, in a 0.5 per cent. solution. Further, adrenalin can be added, but only in the form of adrenalin borate;—as adrenalin-hydrochloride will cause dissociation of the Borocaines. Adrenalin borate can be prepared by dissolving adrenalin in a dilute solution of boric acid until the solution is slightly alkaline in reaction.

Both Borocaine and Beta-Borocaine are issued in tablet and in powder form; also in ampoules of solution. The Indian agents for the preparations are H. S. Clark, 8/10, Waterloo Street, Calcutta; and Byram Mistry, Graham Buildings, 119, Parsee Bazaar Street, Fort, Bombay.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o The Calcutta School of Tropical Medicine, Central Avenue, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

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The Editors of the *Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

Original Articles.

THE OPERATIVE TREATMENT OF FRACTURES: WITH NOTES ON FIFTY-SIX CASES.

By H. HALLILAY, M.B.,

LIEUT.-COLONEL, I.M.S.,

Civil Surgeon, Simla.

I SUPPOSE that no impartial observer, whether he be a layman or a member of the healing profession, would deny that the end results of the treatment of fractures leaves much to be desired. I refer to simple fractures, where for practical purposes the medical attendant is in control of the situation. With compound fractures the case is different, and factors over which the surgeon has no power may render a bad or mediocre result inevitable, however skilfully the conditions have been treated.

The attitude of the profession at large towards these misadventures is reflected in the resignation of the public to the deformity and disability which only too frequently follow them, and the amazing complacency with which the profession as a whole contemplates these very discreditable results.

Of late, however, signs have not been wanting that this pathetic contentment of the profession in the face of so much failure and disgrace is waning. Leading surgeons have agreed with a rare unanimity that something is "rotten in the state of Denmark," or rather in the state of the profession with regard to the treatment of these important and disastrous injuries. The medical press is full of articles praying for better methods, with suggestions for treating fractures in specially appointed "fracture units," to be controlled by specialists. This movement is on foot both in the United Kingdom and the United States of America, where thoughtful surgeons and physicians are becoming increasingly alive to the fact that to give bad results where good can be obtained is to practise a very cruel species of fraud upon the patient and does not enhance the prestige of the profession.

In view of the great advances in surgery which took place in the latter part of the nineteenth century, the backwardness which marked the treatment of simple fractures is the more remarkable.

When I was a student and during my days "in residence," the apparatus and appliances for the treatment of simple fractures were pitiful in their inadequacy; it seemed as though the word "fracture" paralysed all invention.

It needed the great war to reveal the tragic inefficiency of most of the appliances at one's command for the treatment of simple, and still more of compound, fractures.

Probably little or no progress had been made in the treatment of simple fractures from the days of Tutenkhamen or Nebuchadnezzar until the appearance of Sir Arbuthnot Lane's epoch-making work, in which he advocates open operation in all cases of simple fracture in which "accurate apposition of fragments is unobtainable and restoration of the bone to its normal form is of importance to the individual".

I mention Tutenkhamen advisedly because the researches of Egyptologists have established the fact that the treatment of simple fractures in the days of the Pharaohs did not differ in any essential detail from that obtaining too often, alas! at the present day. I refer to the practice of tying pieces of wood or metal to the outside of a limb in which a fracture has taken place.

In the great war, with its immense lists of wounded, the surgeons of the world were confronted by fractures in thousands, such an intensive experience in the treatment of fractures as had never before fallen to the lot of surgeons in any campaign in the history of the human race.

Armed with an antiquated and obsolete equipment, their wards choked with fracture cases, the inventive genius of surgeons was stimulated as never before. New appliances and inventions multiplied with extraordinary fertility, and the treatment of fractures showed an advance which can only be described as amazing. It is none the less a melancholy fact that when one comes to review the treatment of fractures generally in civil practice at the present time, the great war might never have taken place, judging by the resolute refusal of too many practitioners to utilise its lessons in this branch of surgery.

Only a few months ago I was able to rescue an unfortunate medical officer who had fractured both bones of the leg from a prolonged period of immobilisation in plaster-of-Paris after a preliminary traumatic offensive under an anaesthetic. This particular piece of malpraxis is disguised under the euphuism of "setting".

Much of the malpraxis which undoubtedly exists in the treatment of fractures is traceable to the widely spread but entirely unwarranted assumption that any man with a registerable qualification in medicine is capable of treating a fracture.

When it is realised that the treatment of fractures is the business of an expert, that the treatment of any but the simplest of simple fractures may make demands upon the experience and ingenuity of the surgeon to

which those implied in the operation of cholecystectomy or the removal of an acute appendix are in comparison trifling, then we may hope for some improvement in the end results of treatment of these injuries.

If we compare the results of the operative treatment of fractures with those of the non-operative in the hands of experts at the present time, there is no doubt that it is possible to secure excellent results by the application of the principles of flexion and extension, as was done, and frequently with brilliant success, in the case of compound fractures in the great war.

If we wish to establish a comparison of the merits of the two systems on the basis of the patient's comfort and peace of mind, then no one who is not hopelessly prejudiced can deny the overwhelming superiority of the method of open operation.

The method of treatment by extension is admirable in theory, but displays unexpected disadvantages and deficiencies in practice. The theory of the method is that in the case for example of a fracture of the thigh in a muscular person such an extension is applied in the long axis of the limb as will overcome the tone of the powerful muscles of the thigh and thus over-correct the deformity.

The extension is then gradually relaxed so as to allow the ends of the bone which had been separated by the pull of the weight to re-engage. So much for the theory. In practice it may be necessary to apply extensions of 15, 20, 30, 40, 50 lbs. before the pull of the muscles is overcome and the necessary over-correction effected. This extension is transmitted to the limb by means of long strips of adhesive plaster, and with an extension of even 20lbs. the inevitable tendency of the plaster strips is to "creep". Once the plaster has crept a little distance, readjustment of the whole of the plaster becomes necessary with resulting disturbance of the fractured ends of the bone. With some cases of fracture of the thigh with an extension of 30 or 40 lbs., these adjustments may be necessary every other day. The care and attention which must be devoted to fractures put up in this fashion can never be relaxed until union has taken place, and unless the surgeon can arrange to make daily visits it is necessary for him to provide the constant service of a highly trained attendant.

This incurable tendency on the part of the plaster to slip has led to the adoption of other methods of fixation, such as the transfixion of the bone by means of steel pins (Hey Groves) projecting from each side of the limb so as to permit of the attachment of a stirrup from which the extension is made. I can never persuade myself that this is an entirely desirable procedure, because the medullary cavity of the bone is thrown into direct

bacterial continuity with the skin and the outer air, and moreover with a pull of 20 or 30lbs. the pin may "creep" an inch or more in the six weeks or so which is usually necessary for consolidation to take place. Some of these pin tracks leave troublesome sinuses which take a long time to heal up, and the dangers of a chronic infection of the bone are not to be taken too lightly. If for any reason the pin presses on the skin the wound may become intensely painful, indeed all of these methods which rely on extension by heavy weights may give rise to such pain and suffering as to try the fortitude of the patient very highly. Other devices such as calipers, clamps, etc. are open to a certain extent to the same objection. The use of all these methods depending on extension by heavy weights entails prolonged immobilisation of the patient, confinement to bed for long periods, and the infliction of considerable hardship, in that the patient can get little change of position, since any change of position is liable to twist the fracture on its long axis.

Finally, it is admitted that when all shortening has been wiped out by the extension, the fractured ends are not necessarily unhitched and a side-to-side union may result. It is hardly necessary to point out that a union of this type is never likely to be as satisfactory as an end-to-end union, as the application of a force tending to bring the ends of the bone together would conduce to separation of their union, while in the case of an end-to-end union the force would merely bring the ends of the bone into closer apposition at the site of the fracture.

A side-to-side union in its early stages is very liable to re-fracture if exposed to moderate strain; this has happened more than once in this type of union in my own experience.

On the other hand treatment of fractures by open operation presents the following advantages:—

(1). Once the original operation is finished there is seldom any need for subsequent interference.

(2). It is possible to restore the original contours of the bone accurately in an overwhelming majority of cases.

(3). Once the pain of the operation has subsided the limb is painless.

(4). The patient has very much freer movement in bed.

(5). He can get up much sooner.

(6). He is spared much of the mental anxiety, insomnia and discomfort which are entailed by the constant slipping of the extension.

(7). Transport in such cases is a matter of great ease.

The principal objection urged against open operation is the bugbear of sepsis. In my

experience if the technique prescribed by Sir Arbuthnot Lane be rigidly adhered to this need never occur. The present series which is consecutive includes cases done during the war, some at a base hospital on the Persian Gulf where the conditions were anything but ideal, in war hospitals in India, in Simla, but not one of the cases showed a trace of sepsis, nor was it found necessary to operate again for loosened plates or screws. In all cases which I have been able to trace the results have been good; by good I mean that the fractured limb has been restored to full usefulness, and not a sign of deformity or disability has been left. The only visible result of the accident has been the mark of the incision, frequently a very fine and inconspicuous scar.

One other objection frequently urged against the operative treatment of fractures is this:—when a fracture has been fixed by Lane's plates and screws, and is of such a nature that the line of the fracture is exposed to strain by the action of powerful muscles, lateral tension is set up in the screw holes leading to pressure atrophy of the surrounding bone. This of course would result in loosening of the screws and plates and recurrence of the fracture.

The fractures in which this strain might be expected to operate to the best advantage would be fractures of long bones and fractures of the olecranon and of the upper third of the femur.

In practice, however, we find that these are the very fractures which are most amenable to operative treatment and in which the best results are obtained. In the whole of my experience of these cases I have never known a plate to become loose from this cause.

Lastly, in the case of fractures of the upper extremity and of the clavicle in young women or girls, in which it is evident that treatment by non-operative methods will result in deformity, it is at least debatable whether a scar is not the lesser evil of the two. The deformity caused by a badly set fracture of the clavicle or of one or both bones of the forearm catches the eye with an unfailing certainty and is easily visible across a ball-room, whereas a cosmetic scar is difficult to see even at close quarters.

The following list of cases is consecutive. There is no mortality and no morbidity. I have not included any cases done since 1923, nor any done before 1917. Many of these cases have been seen by me up to the end of 1925 and their records are valuable in so far as they illustrate the fact that they have suffered no inconvenience of any kind, although in many cases the plates and screws are still in position. One case which was done during the period under review I have not

included in the series. It was a case of comminuted simple fracture of the lower third of the femur, and it was only after prolonged operation and with great difficulty that I got the fragments into perfect apposition. The fragments were fixed by two plates and a number of screws. On coming round from the anæsthetic the patient was left unattended, became violently excited and kicked and kicked the fractured limb to such effect that he tore out the plates and infected the wound. The case points the moral that it is always wise in these cases to apply a splint until the wound has healed. This patient was operated on in Persia where we had no proper arrangements for nursing the sick, and the disaster would never have occurred had there existed any adequate provision for nursing.

I have chosen a few skiagrams to illustrate as far as possible the appearances of such cases after the lapse of some years after treatment.

THE TREATMENT OF FRACTURES BY OPEN OPERATION.

TABLES OF CASES.

<i>List of cases.</i>	<i>No. of cases.</i>
Clavicle	5
Anatomical neck of humerus	3
Shaft of humerus	6
Lower end of humerus into elbow joint	6
Olecranon	1
Radius and ulna	9
Colles'	2
Ulna	2
Metacarpal	2
Neck of the femur	2
Shaft of the femur	9
Tibia and fibula	5
Pott's	4
TOTAL	56

CLAVICLE.

(1). Khub Lal, driver, Mule Corps. Fracture at junction of outer and middle thirds. Operation, 22-2-19. Long plate. 6 screws. Union by first intention. Plate removed, 22-3-19. Firm union, screws firmly embedded in bone and had to be removed by screw-driver.

(2). Ghulam Nabi, sarwan, 9th Camel Corps. Admitted 6-11-18. No. 49, I.G.H. Bushire, S. Persia. Fell from a camel 14 days before and fractured the left clavicle. After two unsuccessful attempts at reduction under an anæsthetic elsewhere was admitted to No. 49 I.G.H. Operation, 12-11-18. Long plate and 5 screws. Plate removed 30-12-18. Good union and abundant callus. Discharged to duty 14-1-19.

(3). Gunga, driver, 103rd Mule Corps. Aged 33. Operation, 31-12-18. Fracture at junction of middle and outer thirds. Long

plate and 5 screws. Union by first intention. Case discharged to duty 21-2-19.

(4). Aziz, coolie. Operation, 10-8-22. Fracture at junction of middle and outer thirds. Long plate and 6 screws. Union by first intention. Bones firmly united.

(5). Vidoo, coolie. Operation, 7-6-23, Ripon Hospital, Simla. Union by first intention, excellent bony union, no deformity or loss of function.

ANATOMICAL NECK OF THE HUMERUS.

(1). T.A., bombardier, Poona. Operation, November 1917 at Deccan War Hospital, Kirkee. Fracture of the anatomical neck of the humerus. Only a small fragment of the shaft was left attached to the head of the bone, but this was fixed to the shaft by a small plate and screws and a long screw passing obliquely into the head through the bicipital groove. Union by first intention and complete restoration of function.

(2). S.L.K., aged 42. Fell from a motor car on to his right shoulder, at Simla, on October 7th, 1920. Operation, October 1920. The fracture was very similar to the preceding case, only a small fragment of shaft remained attached to the head. After considerable difficulty the ends were brought into accurate apposition and fixed with a small plate and screws. Union by first intention. I saw this case again in Calcutta in 1923. The anatomical and functional results were perfect; so much so indeed that the patient's principal complaint was that none of his friends or relatives will believe that the shoulder was ever fractured!

(3). Amir-ud-Din, aged 53, epileptic. Fractured his left shoulder during a fit. Operation, 11-10-23. Head completely separated and twisted so that the fractured surface looked upward and forward. Both tuberosities were separated. Upper end of lower fragment in axilla. The articular surface was secured to the shaft by two twists of iron wire and two plates. One of the tuberosities was secured by a long screw. The case was discharged cured.

SHAFT OF THE HUMERUS.

(1). Rama, sweeper, No. 21 Sanitary Section, Bushire, Persian Gulf. Fell and fractured the left humerus. Admission, 2-12-18. Operation, 11-12-18. The fracture occupied the site of the musculospiral groove. The musculo-spiral nerve and the superior profunda artery were identified and lifted out of the way and a 4-inch plate was slipped under the bone. A small plate was applied to the lateral aspect of the bone. Union by first intention, excellent firm union of the bone. Full restoration of function.

(2). Makkand Sing, driver 103rd Mule Corps, Bushire, Persian Gulf. Fracture of

the left humerus at junction of lower and middle thirds. Musculo-spiral nerve hooked out of the way, and long plate and 6 screws applied. Union by first intention, firm union of bone, and complete restoration of function.

(3). Mohinda, Ripon Hospital, Simla. Operation, 24-4-21. Fracture at junction of middle and lower thirds. Stout plate and 6 screws. Complete restoration of function. Union by first intention.

(4). Surat Ram, Ripon Hospital, Simla. Operation, 6-3-22. Fracture in middle third. Stout plate and 5 screws. Union by first intention. Complete restoration of function.

(5). Kapuria, cultivator, aged 32, Koti State, Village Pagola. Fracture of upper third of humerus by indirect violence. Positive Wasserman reaction. Operation, 5-4-23. Incision along anterior border of deltoid, fracture united by stout plate and screws. Excellent result, discharged apparently cured.

Re-admitted for a fresh fracture in the middle of the humerus. There was no disturbance of the former fracture which was firmly united, the plate and screws in place and holding firmly. The fresh fracture was fixed with stout plate and screws. Union by first intention.

FRACTURES OF THE LOWER END OF THE HUMERUS INTO THE ELBOW JOINT.

(1). Lulu Ingram, aged 11. Poona. August 1917.

This case had been put up in a position of full flexion after the method of Robert Jones about a month previously. He was sent to me because the arm could not be moved at the elbow joint. X-rays showed that the joint was locked by the lower end of the upper fragment. There was a transverse fracture supra-condylar, and the condyles had been carried up behind the lower end of the upper fragment; in short the usual condition obtaining in an unreduced fracture of the lower end of the humerus. The malunion was divided and the fragments accurately replaced and secured by a Y-shaped plate. Her mother writes in October 1919 to say that the movements are completely restored, and that there is no deformity of the arm.

(2). Sayad Hussain, aged 20, sepoy, 117th Marhattas, Bushire, Persian Gulf. Operation, 15-1-19. T-shaped fracture into the joint which was completely disorganised and there was considerable absorption of the ends of the bone. The outer condyle was fixed to the shaft by means of two plates and screws, but the inner fragment afforded no screw hold, and it was fixed in position by means of periosteal sutures. Primary union.

This case was invalided to India before full restoration of movement was regained, as by

an Army Order all but the most trivial cases had to be sent to India.

(3). Roknee, aged 6, Ripon Hospital, Simla. Operation, 11-8-21. Union by first intention. Complete restoration of function.

(4). Charles Robertson, aged 14, Ripon Hospital, Simla. Operation, 19-6-23. Fracture into the joint, complete separation of the lower end of the humerus, which was displaced behind the lower end of the upper fragment. Fragments replaced in position and secured by two angle plates and 6 screws. Plates removed 18-9-23. Good union.

(5). Devi Saran, aged 13, Ripon Hospital, Simla. Operation, 26-7-23. T-shaped fracture into the joint. Fragments replaced and fixed with two angle plates and screws. Perfect restoration of function on her discharge. Plates removed on 15-9-23. Union by first intention.

(6). Rashik Mohan, aged 11, Ripon Hospital, Simla. T-shaped fracture into the joint. Fragments replaced and fixed in position with two plates and eight screws. Perfect restoration of function on discharge. Operation, 18-9-23.

FRACTURES OF THE OLECRANON PROCESS.

(1). M.I., aged 45, Ripon Hospital Simla. Operation, 14-10-22. Comminuted fracture into the elbow joint. Fragments replaced and fixed by two plates and eight screws. Seen July 1925; perfect anatomical and functional result.

FRACTURES OF THE RADIUS AND ULNA.

(1). Capt. O., No. 49 I.G.H., Bushire, Persian Gulf. Fracture of both bones of forearm by falling from his horse when racing. After unsuccessful attempts at reduction under an anæsthetic the patient was sent to me for operation. The fragments were replaced in good position and fixed by two stout plates. Radius plated on outer aspect, four screws; ulna on posterior aspect with six screws. Union by first intention. He was sent to India on 28-2-19. I saw this case again in August 1923 when he had perfect restoration of function, and no deformity. The plates had not been removed.

(2). Elliott Allum, aged 9, Ripon Hospital, Simla. Fracture of both bones of forearm. Operation, 19-7-22. Fracture reduced and the radial fragments fixed by an outer plate and three screws. The fracture was very near the end of the bone and might have been classified as a Colles' fracture. Perfect anatomical and functional result.

(3). Santokh Singh, aged 13, Ripon Hospital, Simla. Operation, 14-9-22. Fracture of both bones of the lower end of the forearm. Fracture reduced and fixed by one plate and 4 screws on the anterior surface of the radius. This maintained the ulna fragments in

excellent position. Full restoration of function of limb at time of discharge.

(4). Chatroo, aged 20, Ripon Hospital, Simla. Operation, 14-9-22. Radial fracture reduced and fixed in position by stout plate and screws. X-rays showed imperfect reduction of the ulnar fracture, so on 17-11-22 the ulna fracture was reduced and fixed by plate and screws. Perfect restoration of function. Union by first intention of both wounds.

(5). Esther Turner, aged 10, Ripon Hospital, Simla. Operation, 26-3-23. Ulnar plate in excellent position. Plate removed on 19-7-23. Perfect restoration of function.

(5). Esther Turner, aged 10, Ripon Hospital, Simla. Operation, 31-5-23. Fracture of both bones of the forearm. This was a re-fracture, the arm having been fractured some months before and put up in splints. There was much callus at the site of the radial fracture. Fracture reduced and controlled by an ulnar plate. Plate removed on 17-7-23. Perfect restoration of function. The skiagram showed complete absorption of radial callus and perfect restoration of form of both bones. Her parents informed me in June 1925 that she had full use of the arm and that there was no deformity.

(7). John Waugh, aged 12, Ripon Hospital, Simla. Operation, 31-5-23. Fracture of both bones of the forearm. Fracture reduced and controlled by a radial plate. Removed on 17-7-23. Perfect functional and anatomical result.

(8). Barbara Dunn, aged 4, Ripon Hospital, Simla. Operation, 13-9-23. Fracture of both bones of the forearm, high up. Radius exposed and single plate with 4 screws applied. Plate removed on 21-10-23. Seen in October 1925. Form and function perfect.

(9). F.G., Ripon Hospital, Simla. Fracture of both bones of forearm, high up. Difficult case as it was necessary to identify the posterior interosseus nerve and slip the radial plate under it. Operation, 27-6-20. Stout plate also applied to the ulnar fracture. Excellent functional and anatomical result. Case was seen by me in August 1925. No trouble of any kind from the plates.

COLLES' FRACTURE.

(1). Girdhari Lal, aged 50, Ripon Hospital, Simla. Operation, 7-7-23. Comminuted and impacted fracture of radius. Reduced and fixed by plate and 3 screws. Union by first intention. Perfect functional and anatomical result.

(2). Kenneth Cole, aged 15, Bishop Cotton School, Simla. Operation, 27-10-23. Both bones were broken. Radial fracture disimpacted and controlled by plate and 6 screws. Union excellent and position perfect.

FRACTURES OF THE ULNA.

(1). Chatroo, aged 20, Ripon Hospital, Simla. Operation, 30-10-22. This case had been operated on a fortnight earlier and a plate and screws applied to the radius; this did not as usual control the ulnar fracture, so a second plate was applied to the ulnar fracture. The line of both bones was completely restored and the functional result perfect.

(2). Ihsan-ul-Haq. Operation, 24-10-23. Fracture of olecranon $2\frac{1}{2}$ inches below point of the elbow. Two plates and 8 screws. Perfect restoration of function.

FRACTURES OF METACARPAL BONES.

(1). J.S., Poona, aged 53. Operation, October 1917. Fracture of the head of the right metacarpal bone. The fragment was replaced and fixed in position by a small silver plate and two screws. Perfect restoration of form and function.

(2). W.S., Poona. Fractured head of 5th metacarpal by direct violence. Small plate and screw. Functional and cosmetic result perfect.

FRACTURE OF THE NECK OF FEMUR.

(1). Bahadur Khan, aged 21, motor driver, M.T., Bushire, Persian Gulf. Run over by a motor car which passed over his left thigh on 25-2-18. Operation, 25-3-18. No attempt at healing, fracture of neck just inside the capsule. Fragments fixed by small plate and screws and a long screw driven in between the great trochanter and shaft into neck and head. Was invalided to India on 25-4-18. Union by first intention.

(2). Ashley Stone, Walker Hospital, Simla. Operation, 13-7-22. Fracture of the neck just inside the capsule. Fracture reduced and fixed in position by plate and screws. Primary union. Plate removed later. Perfect functional result, no shortening or deformity.

SHAFT OF THE FEMUR.

(1). Bachan Singh, aged 20, sepoy, 2194th Infantry, Bushire, Persian Gulf. A large stone fell on his leg while road mending on 13-12-18. When he was admitted there was $2\frac{1}{2}$ inches of shortening and some periosteal callus. Operation, 9-1-19. Owing to a famine in plates I was obliged to use a small plate with only 6 screws. Primary union. About two months later the patient complained that something had snapped in his leg. As he complained of pain it was decided to open the wound and examine the plate. There was no shortening or deformity. This was done when it was found that the plate had broken in half between the third and fourth screw holes. The screws were firmly in place and required considerable force to remove them.

Firm union had taken place with good but not excessive callus. No shortening or deformity. Discharged to India on 4-4-19.

(2). T.H., aged 40. Fractured his femur three months previously. He was sent up to Simla with $2\frac{1}{2}$ inches of shortening and had only just been allowed to get about on crutches. He fell in his bathroom and re-fractured the femur. This is very likely to happen after slight trauma with a side-to-side union. At the operation a great deal of soft and unsatisfactory callus was found. The ends of the bone were cleared of all clogging callus and the fragments brought into accurate apposition and fixed with a stout steel plate and screws in perfect position. Operation, October 1920. Began to walk in January 1921. I saw this case in August 1925. There is no disability of any kind, no shortening or deformity.

(3). Sant Ram, aged 6, Ripon Hospital, Simla. Transverse fracture of middle of femur. Operation, 13-8-21. Fracture reduced and fixed with stout plate and screws. Union by first intention. I saw this case in July 1925. He has no disability of any kind, no shortening or deformity. Skiagram 1



Skiagram 1. Case No. 40. Sant Ram. Left femur. Operation on 13-8-21. Taken on 17-1-26.

Except that it shows a slightly denser shadow than normal it would be impossible to say that a fracture had taken place.

was taken on January 17th, 1925. Except for rather denser shadow, the bone shows no sign of having ever been broken.

(4). Nankoo, aged 30, Ripon Hospital, Simla. Operation, 11-4-22. Transverse fracture. Perfect result on discharge.

(5). Kanshi Ram, Ripon Hospital, Simla. Operation, 12-9-22. Discharged cured with perfect result.

(6). Vidya, aged 9, Ripon Hospital, Simla. Operation, 11-10-22. Discharged cured with perfect result.

(7). Jhagru, aged 27, Ripon Hospital, Simla. Operation, 10-5-23. Fracture of right femur. Discharged cured with perfect result.

(8). Shakuntala, aged 10, Ripon Hospital, Simla. Oblique fracture of femur. Operation, 9-8-23. Discharged with perfect result.

(9). Bhagta, aged 11, Ripon Hospital, Simla. Operation, 8-9-23. Fracture reduced and fixed by stout plate and 8 screws. Functional and anatomical result perfect.

FRACTURES OF TIBIA AND FIBULA.

(1). Ragunath Pershad, aged 5, Ripon Hospital, Simla. Oblique fracture of tibia and fibula. Operation, 25-3-23. Fracture reduced and fixed with plate and four screws. Union by first intention. Case seen July 1925. Perfect restoration of function, no deformity or limitation of growth.

(2). Lady W., Ripon Hospital, Simla. Comminuted fracture of both bones of the leg just above the tibio-fibular articulation. Direct violence, pony fell with her and crushed her foot against a rock. Operation, 7-11-21. The tibia was badly comminuted, and as it was impossible to find an adequate screw hold on the outer surface, the plate had to be applied to the inner subcutaneous surface. Began to walk on 12-2-22. Can now walk 10 miles without fatigue, and can play badminton. Seen in 1925.

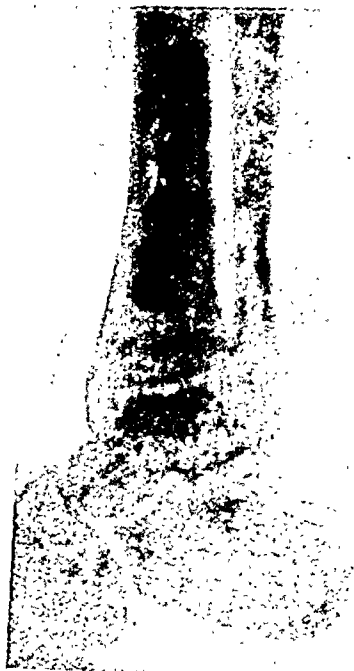
(3). Ashraf Bibi, aged 7, Ripon Hospital, Simla. Operation, 13-10-23. Transverse frac-



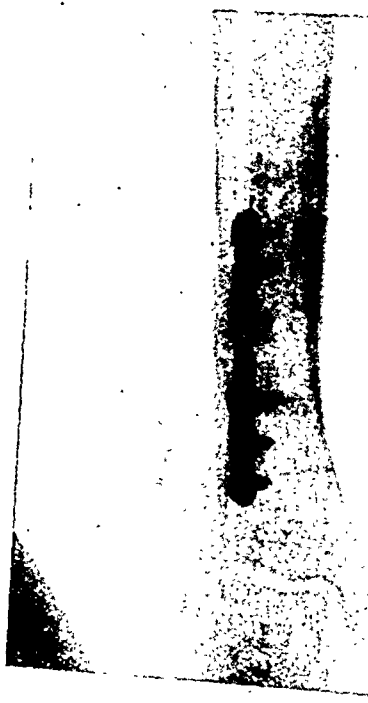
Skiagram 2. Case No. 49. Ashraf Bibi, 11-10-23.

ture of both bones above the ankle joint. Fracture reduced and fixed by 2 plates and

11 screws. Union by first intention. I saw this case on my return to Simla in July 1925. Perfect functional and anatomical result. No interference with growth. Skiagram 2 illustrates the fracture, and skiagrams 3 and 4 the result in 1925.



Skiagram 3. Case No. 49. Ashraf Bibi, 1-8-25.



Skiagram 4. Case No. 49. Ashraf Bibi, 1-8-25. Note absence of rarification above screws nearly 2 years after insertion.

(4). Daulat Ram, aged 34, Ripon Hospital, Simla. A very badly comminuted fracture of the tibia. The fibula was also comminuted. The fracture was reduced and fixed by two plates and one long screw. The fracture of the fibula was also reduced and fixed in correct

position. Operation, 5th June 1923. This man was a prisoner and had received these injuries while committing a burglary. He was discharged in November 1923 and was able to walk well when he left, without lameness or pain.

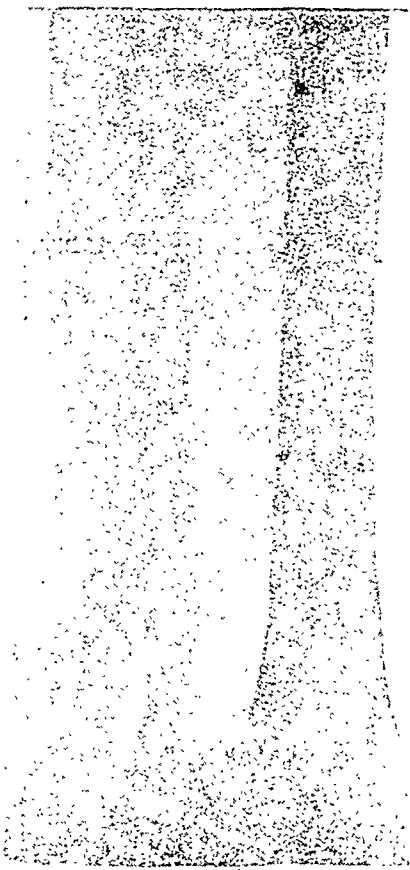
(5). Mrs. B., aged 70, Walker Hospital, Simla. Operation, 5-5-20. Oblique and comminuted fracture of tibia. The fibula was also fractured. Fracture reduced and fragments fixed by two plates and screws. Discharged on 28-9-20. An excellent result, union by first intention. The patient said that the broken leg was now the better of the two! No lameness or deformity.

POTT'S FRACTURE.

(1). Nathu Ram, aged 35, Ripon Hospital, Simla. Indirect violence; his leg was wrenched violently by one of the machines in the Government Printing Press. Operation,

(2). Miss R., nurse, Ripon Hospital, Simla. Pott's fracture three months earlier. Great pain and lameness. This was a typical unreduced Pott's fracture with the foot in the characteristic valgoid deformity. Operation, May 1922. Ends of the bone cleared of callus, fragments restored to position and fixed by plate and 3 screws. A tendency to "spring" was checked by driving a single screw through both fragments. An excellent result. Was able to return to duty and at the present time is carrying on her work as hospital nurse without any inconvenience.

(3). Abdul Ghaffur, aged 35, Ripon Hospital, Simla. A very bad Pott's fracture-dislocation. The lower end of the fibula is seen in skiagram 5 to be lying on the astragalus. The mortice of the joint is widely opened and the astragalus is dislocated outwards and backwards. (Skiagram 6).



Skiagram 5. Case No. 54. Abdul Ghaffur, 27-8-23.
Note outward and upward dislocation of
astragalus.



Skiagram 6. Case No. 54. Abdul Ghaffur.
Note backward dislocation.

31-1-22. The fibular fragments were restored and fixed by two plates and screws. There was a very considerable "spring" on the fragments, imposing a good deal of tension on the screws. Union by first intention. Excellent result, no lameness or pain on walking. Anatomical result perfect. Case seen again in July 1925 when result perfect.

Operation, 28-8-23. The fibula was fixed by a stout plate and 6 screws. The lower part of the fibula plate was bent in conformity with the curve of the lower end of the outer malleolus. Perfect restoration of the joint and an excellent functional result. Skiagrams 7 and 8 show the result after removal of the plate on 18-10-23.



Skiagram 7. Case No. 54. Abdul Ghaffur, 18-10-23.
Plate removed.

(4). Mahadi, aged 40, Ripon Hospital, Simla. Fracture of fibula, separation of tip of inner malleolus. Operation, 26-7-23. Fibular fragment fixed by 2 plates and screws. As is usual in these fractures of the fibula, there is a great tendency to "springing" of the fragments and there must be considerable tension on the screws, but I have never known them to become loose on this account. Union by first intention and an excellent result.

SOME REFLECTIONS ON THE ART OF SURGERY OF THE ANCIENT HINDUS.*

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Introduction.—The topic of the surgery of the ancient Hindus, though a very interesting one, is a difficult problem to deal with, for a major portion of the ancient literature of the Hindu medical science, which once evoked the respect of the entire world, is at present in darkness and almost total obscurity. In order that this ancient science may be appreciated and the best use made of its hidden treasures, I consider it desirable and necessary that the different avenues of the science should



Skiagram 8. Case No. 54. Abdul Ghaffur, 18-10-23.
Plate removed.

be explored and critically examined. This will be a difficult task but it can be accomplished by such ardent workers in this field as are both scholars of the ancient lore and of western philosophy. Accordingly in face of such difficulties I beg to apologise for limiting myself, as the title of this paper suggests, merely to reflections on the art of surgery of the ancient Hindus.

History.—We find that the historians are unanimous in the statement that the civilisation of the ancient Hindus is one of the oldest civilisations of the world and that their sages were the fountain-heads of all knowledge. We further note that in early days there existed between India and Greece commercial inter-communications, which greatly influenced the art and industries of the respective countries. We are also informed that the Greeks owed a great deal to the ancient Hindus for the growth and development of their knowledge. I think it worth while to quote some of the original opinions of Western scholars on this point.

Opinions of the Western Authors.—Says Wise—"It is to the Hindus that we owe the first system of medicine."

Cole Broke asserts that the Hindus were teachers not learners.

Cunningham says—"Indians have the advantage in point of time and I feel satisfied that the Greeks borrowed much of their philosophy from the East."

* An address read before the All-India Ayurvedic Conference held at Jaipur in April 1926.

Royle has proved beyond doubt the indebtedness of the Greeks and the Arabs to the Hindus.

Neuberger says—"The similarity between Indian and Greek medicine is in its outline and in certain details so striking that the originality of the Greeks has frequently been questioned and even denied. The Arabs, like the Greeks, also owe a debt of gratitude to the ancient Hindus for the growth and advancement of their knowledge."

The modern medical science of the West, which is principally based on the Grecian system, is thus indirectly dependent for some particulars at least upon the Indian system. In consideration of the outstanding facts and independent achievements of the Hindus in most of the branches of the science and art, and of their aversion to foreign influences, the trend of modern opinion supported by recent discoveries is drifting towards recognising the originality of the ancient Indian medicine in its most salient features.

The Old Triad of Charak, Susrut and Vag Bhat.—Among the great medical men of ancient days the chief authors of repute were Charak, Susrut, and Vag Bhat.

Charak was a physician of high talents who had also some knowledge of foetal development. The Indians regard him as a *rishi* of great antiquity, while some of the Western scholars try to connect him with historical events of more modern times. They say that Charak was a court physician of King Kanishka of the Indo-Scythian dynasty which held its sway over India in the first century A.D. But Dr. Ray has pointed out that the name Charak is used as a patronymic in the Vedas. It is possible that a namesake may have lived afterwards, just as other men appeared later with similar designations after Vag Bhat I. We do not actually know the period when Charak lived. The general consensus of opinion is that he lived prior to Susrut.

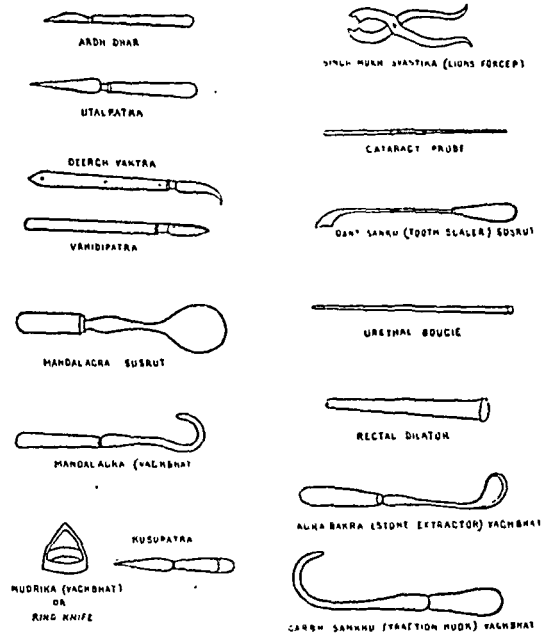
Susrut was one of the descendants of the famous Vishwamitra family of which we hear so much in our sacred books of the epic age, namely, the "Ramayan." He was a favourite disciple of Dhanwantri, who is regarded as the god incarnate of the medical science of the Hindus. We are equally uncertain of the exact chronology of Susrut. It is only presumed from certain historical facts that he flourished near about the Buddhist era some 500 years before the birth of Christ. Susrut was an ardent student of Nature with varied knowledge and information regarding human life. He was famous more as a surgeon and it is to him that we owe our first knowledge of the art of surgery in any systematic way. He is reported to have practised bone and cranial surgery with special ability and also to have written a notable book on surgery known as "Susrut Samhita," which has been later commented upon by several succeeding authors. His work is particularly important to us in that it contains valuable information regarding the uses

and descriptions of the surgical instruments of the ancient Hindus.

Vag Bhat was the next author of celebrity that came after Susrut. He also wrote an important book, "Ashtang Samgraha," which is still extant. Regarding the age of Vag Bhat, we are as much in darkness as with his predecessors.

These three great medical men formed the old triad associating themselves with the great three *yugas* of the Hindus, namely, "Treta, Duapar and Kali," respectively.

Classification of Instruments and Operations.—Susrut classified surgical instruments under two big heads, the blunt and the sharp cutting instruments. He sub-divided the blunt instruments further into 101 varieties arranged under 6 big classes and used for about 24 different kinds of surgical manipulation of a non-cutting nature. He described about 20 different kinds of sharp implements designed for about 8 different kinds of surgical operations of a cutting nature. Vag Bhat II, on the other hand, recognised only



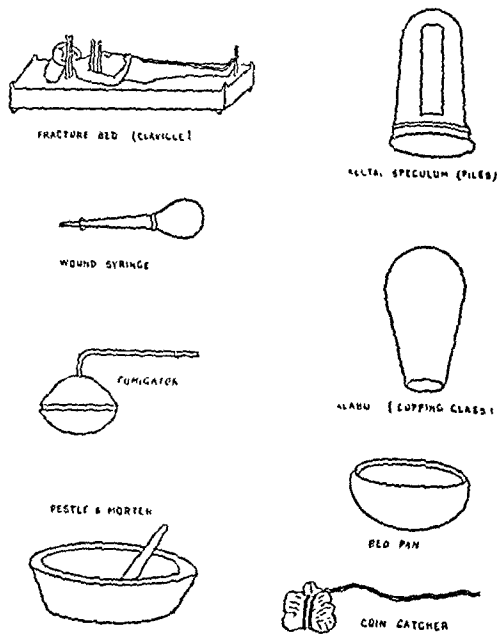
15 kinds of manipulations performed by blunt weapons and 13 kinds of surgical operations by cutting instruments.

Vag Bhat II, Harita and many others who succeeded at a much later date, differed from Susrut and Vag Bhat I, both in the number and kinds of operations performed by the blunt and sharp instruments.

Considerations of space prevent my giving an exhaustive account of the surgical instruments used by the ancient Hindus; but the two plates accompanying this article illustrate a few of the more important ones. Many of the illustrations are taken from Girindranath Mukhopadhaya's "Surgical Instruments of the Ancient Hindus," Vol. II, illustrations. They are not all of pure Hindu origin, but are illustrations from actual specimens found in archaeological excavations in

different parts of the world, and now stored as curiosities of historical interest in some of the more famous museums of the world. They represent rather a compendium of the surgical instruments that were used in those days by the different nations of the world; but they belonged to the Hindus in the sense that instruments similar to them are described in the literature of the ancient Hindus.

The armamentarium of the ancient Hindu surgeons consisted of a considerable number of instruments designed for a variety of operations, and many of the instruments of ancient days, both in their forms and use, closely resembled those of modern days; a fact which is to the credit of those ancient surgeons for their correct and sound judgment.



Among the knives illustrated, the Arddhar resembles some of the modern tenotomes, such as those of Adams and Parker, as illustrated in Down Brothers' catalogue. As the name signifies, the sharp edge only extends half way along the blade.

The Utalpatra is a double-edged short knife, employed for plunging into any deep cavity or abscess. A similar instrument in modern surgery is to be found in Koch's perineal knife or Paget's knife.

The Vrhedipatra is the ordinary pattern of surgical scalpel, used to-day in every-day practice in the operating theatre. The Deergh Vaktra pattern of Vrhedipatra corresponds to the curved sharply-pointed bistoury of modern times.

The Mandal Agra knives comprise an interesting group of surgical instruments. Susrut used them for adenoids and for certain plastic operations on the eyelids. A large Mandal Agra of Susrut resembles the blade of a tonsil guillotine in its essential feature; the sharp cutting edge of the blade is situated at one extremity, which is convex outwardly.

Vag Bhat used a knife in which the blade was curved and moon-shaped, with the sharp edge concave inwardly. It was employed by him for cutting the neck of the fetus during difficult labour. The Mandal Agra of Vag Bhat thus resembles the decapitating hook of Ramsbotham in modern midwifery.

The Kusnpatra had a long blade with a short handle. It was used chiefly for cutting very deeply. Some of the modern amputation and resection knives appear to bear a resemblance to this class of knife.

The Mudreka is the ring knife of modern days in its improved form. It was originally put on the tip of the index finger and used to scrape away adenoids or to separate a tumour with it from the adjacent tissues.

Among the Swastika or forceps, the Singh Mukha Swastika of the past has retained its use and form and represents the lion forceps of the present day,—so often used in bone surgery.

The ancient cataract probe, the Dausanku or tooth scaler, the urethral bougie and the rectal dilator of ancient days bear a close similarity to those of the present time. Further, the Agra-hakra or Saraphanka Sala, and the Garbh Sanku of Vag Bhat bear a very close resemblance to the lithotomy scoop and the traction hook of modern times, respectively.

The coin catcher of ancient days consisted of a bundle of hairs tied to a string and thin linen thread, and was very much like the modern probang in its use and function.

Further, most of the therapeutic appliances, surgical sundries, and hospital requisites of ancient days—only a few of which are illustrated here,—though outwardly different in shape and form from those of modern times, yet very clearly illustrate the fact that the ancient Hindu surgeons were fairly well acquainted with the art of nursing and the management of patients in hospital. In the treatment of fractures and dislocations, the fracture bed for fracture of the clavicle, here illustrated, although widely dissimilar in construction to modern appliances, yet clearly applies the fundamental principle in treatment of securing absolute rest to the broken bone, and perfect immobilisation of the limb,—a principle which constitutes the chief element in the modern treatment of this injury.

Nature of the Materials.—The surgical implements were generally made of iron. All cutting instruments with sharp edges were made of steel of a superior quality. The other metals which were frequently used were copper, tin, zinc and lead; amalgams and alloys composed of two or more metals were often employed where a soft and pliable metal was required. Many of the *salakas* such as probes, seekers, directors, applicators, collyrium rods and other such instruments were made of this metal. Bell-metal was also used. Gold and silver were also used sometimes. Horns of cattle, preferably those of a cow, were used in place of cupping-glasses. Protection

rings of bone and ivory were put on as finger guards. Bamboo reeds and wooden smoking pipes were employed as injection tubes and for vapour baths. Leather was used for preparing perineal and abdominal binders and making bags for holding water. Green creepers and twining plants were made use of as binding material. Horse-hair, silk, twine, and ordinary linen thread, or *rajju*, were employed as suture materials. Vag Bhat I is claimed to have advocated the use of purified goat's gut as a suitable material for ligaturing blood-vessels during venesection. Drainage tubes were improvised by collecting long coarse hairs together. Stones were used as pestles and mortars, and grinding slabs and hollow stones as basins for holding the dirty fluids of the body.

Nature of Operations.—Regarding the nature of the operations themselves, many plastic operations of the eyes and nose were undertaken. Cataract was treated by couching as practised by most of the quack surgeons of the present day. The Indian method of rhinoplasty in modern surgery has been borrowed from the ancient Indian surgeons. Obstetrical work was also done. The foetus was brought out of the womb when a pregnant woman was in trouble. Abscesses were opened, tumours removed, sinuses scraped, wounds properly dressed and drainage tubes often employed. Though considered to be a severe and most dangerous type of operation, the removal of stone from the urinary bladder was also attempted by some surgeons of that time. Great dexterity of hand and manipulative skill were displayed in the dilatation of urethral strictures by straight bougies.

Progress of Surgery.—The greatest achievements from the operative point of view in ancient Hindu surgery, however, were obtained in the branch of osteal surgery. Success in cranial surgery was an asset of those times. The reason for this efficiency in bone surgery is, I conjecture, to be found in the incessant wars which the kings of yore waged against one another. Battles were fought with bows and arrows, lances, spears, swords, daggers, clubs and many other cumbrous weapons which killed few but disabled a much larger proportion of the combatants. This afforded innumerable chances to the surgeons for specialising in this particular branch of the great art. This conjecture is well supported by the fact that in the whole armamentarium of the surgical instruments, we find the greatest variety in those implements which were specially used in times of war for extracting foreign bodies from the limbs of wounded soldiers.

Insensibility to Pain during Operations.—The Hindu surgeons felt the necessity for producing insensibility to pain in weak and nervous patients before a serious surgical operation, but they were not able to achieve anything of practical value in this direction. The old Hindu text is absolutely silent regarding the administration of any drug

by inhalation to produce general anæsthesia in the patient before the operation.

Considerations of space do not allow me to enter into the details of the notions which the ancients held regarding the construction and site of hospital buildings, hospital equipment, sanitation, principles of nursing and child welfare.

Decline of Surgery: Its Causes.—In the time of Susrut the ancient Hindu surgery reached its climax, but soon after him however, we notice signs of its decay, and in the Buddhist era we find the art deplorably deteriorated. People were forbidden to eat cooked rice touched by the hands of a surgeon. Those who performed dissections were abhorred and offered the lowest seats at social gatherings. To touch a dead animal or a human corpse even for the sake of knowledge was considered to be highly irreligious. Consequently people of the higher ranks abandoned this profession, and the art ultimately fell into the hands of the people of the lower classes. Even at the present day we find most of the barbers and herdsmen practising the art of surgery in the rural areas of this country.

We further notice that certain regions of the body were not allowed to be operated upon. The abdomen was considered as a sacred part of the body. Operations for anal fistula, removal of piles or rectal polypus, tapping, or administering an enema were permissible, however. In still later years it is most annoying to observe that even lancing of a fistula-in-ano or the use of a clyster was forbidden on religious grounds and consequently the operative treatment of fistula-in-ano was given up.

Political Causes.—The failure of Hindu surgery is assignable to several causes of diverse nature. India from time immemorial has experienced many political ups and downs. Kingdom after kingdom rose and fell; this influenced in many ways the knowledge and civilisation of the people. The greatest loss which India suffered was, however, sustained through foreign invasions which deprived the Hindus of much of their precious art and literature. More than ten centuries have now elapsed since Bharatvarsha ceased to exist as an independent country and became subject to the influence of foreign governments which seldom cared to help or uplift the medical system of this country.

Religious Causes.—Religious revolutions acted more adversely than politics. They changed the entire mentality of the people and made them more or less indifferent towards the study of natural science and imparted a severe shock to the progress of surgery. The Hindu sages had a wide and varied experience of human life and it was the belief of the people at large that the knowledge which their *gurus* professed to possess was obtained through direct revelation from Providence. Consequently the people believed firmly in the teachings of their religious preceptors and respected them whole-heartedly. Even in matters other than religious or social, the opinions of the

gurus were very often upheld and regarded as infallible. In "Moho Vagga," one finds the Lord Buddha rebuking and admonishing several sick monks upon their willingness to allow surgeons to lance an anal fistula or to use a clyster. He actually forbade the use of a knife in such regions of the body where the skin was tender and the wound difficult to heal.

In modern times also we often come across certain intractable cases of fistula-in-ano which are extremely difficult to cure. It is quite possible that in those early days the results of operative surgery in such regions might have been disappointing and thus compelled Lord Buddha to utter such a statement and to charge people with committing a grave offence if they disobeyed him.

I have related this incident not as a protest against the Hindu preachers but only as a fact of historical interest which proves beyond doubt how implicit was the faith of the Hindus in the teachings of their religious masters. The verdict of Lord Buddha was hailed with one voice and the operative treatment of fistula-in-ano was finally given up. Later on, Shanker Acharya who unfortunately happened to suffer from this disease was fruitlessly treated for a long time with ointments. It is a pity that the great religious reformer after a prolonged and protracted illness died without receiving any rational treatment, although he was attended throughout by the most renowned doctors of the time.

The evil results of the sacred surveillance soon appeared. The Hindus grew more conservative, they lacked the progressive spirit and all their knowledge became stale, contorted and condensed in the form of religious dogmas.

Though religion and politics both deterred the progress of Hindu surgery, the greatest factor which accounted for the early decadence and total extinction of this art, producing a wide gap in the Hindu medical science, was the failure of the Hindus to grasp certain fundamental principles of surgery. In spite of the fact that the medical sages of yore were resourceful, their observations correct, their judgment sound, their manipulations dextrous, their knowledge was of an empirical nature and far short of being placed upon a rational and scientific basis.

Being very observant, the ancient authors knew a very large number of facts which they always tried to condense into the form of sacred sayings or proverbs. The problem of how and why seldom worried their brains, and whenever it did they framed an explanation best conforming to their principles and conceptions without confirming them by practical experiments. Each saint was considered to be an emblem of perfection, whose right none were permitted to dispute and whose views none had the courage to criticise. The whole spirit of critical study was absolutely wanting. The people were so bound down with religious prohibitions that they were never given any free scope to work independently. In the course of a discourse in "Moho Vagga,"

we again note that people could not employ certain earthenware receptacles for holding ointments or keep a leather bag for carrying instruments or use a metal reed for encasing some *salakas*, such as probes or collyrium rods unless the religious lord was pleased to pronounce his goodwill and formally sanction the use of the same. It is regrettable that even in such trifles people could not make an independent move without consulting their religious chiefs.

This predominating influence of the Hindu priests proved to be a great stumbling-block for the Hindus in their pursuit of Nature's study.

Real Shortcomings.—Turning to the main defects of the ancient system, we may first study the shortcomings of the ancient Hindus regarding their knowledge of anatomy and physiology upon which the whole fabric of modern surgery is built up.

As compared to the colossal achievements won by Western medical science in the study of anatomy, the knowledge of the ancient Hindus was on the whole very meagre, and wanting in several important aspects. Their system of imparting medical education, though the best of its kind in those days, was after all primitive and imperfect, and the procedure of dissecting human dead bodies utterly crude and unscientific when we contrast it with the more elaborate and improved methods of present times.

The chief sources for the study of anatomy consisted of quartered animals which were sacrificed on some religious occasion. The Hindu sages would then avail themselves of the opportunity to address a discourse on the subject of anatomy to their disciples. It is alleged that they performed dissections of human dead bodies by the process of Avagrashana as originally promulgated by Susrut, the propounder of this art of surgery. According to this process the dead body was first covered with *kusa* grass and placed beside the edge of the water of a small stream. After three or four days it was taken out carefully and the successive layers of epidermis, and the muscles beneath were gradually removed by lightly rubbing over with a soft brush.

We ought to appreciate the spirit and courage of the ancient scholars in studying anatomy in this way. We may also acknowledge the originality of the method and appreciate its practical value of demonstrating in a lucid way some of the anatomical structures such as arteries and veins to the students. It is further believable that this method could also have put the people in possession of a large number of anatomical facts and enabled them to enumerate most of the arteries in the human system.

The method, in its primitive form, was quite unsuitable as a practical means of teaching anatomy to students; furthermore, it was unwholesome and obnoxious. It did not help the student to study the anatomical relations and positions of the different organs in the body—a knowledge of which is so important from the

surgical point of view. Besides this many of the organs which putrefy and decompose quite early could not be studied satisfactorily by this method; hence the fact that the knowledge of the ancient Hindus regarding the anatomy of the brain and spinal cord was very vague and inaccurate. Further, the ancient scholars did not appreciate the existence of certain important abdominal viscera such as the appendix, the suprarenal and other endocrine glands, and they even made gross misrepresentations in the total number of bones in the human skeleton. It was in the time of Susrut that the knowledge of anatomy made an appreciable advance, but as ill luck would have it the knowledge of anatomy began to deteriorate soon after Susrut when the people—owing to the growth of certain religious prohibitions—gave up the practice of learning anatomy by performing practical dissections. By and by the knowledge of anatomy was forgotten and people then began to indulge in queer and strange conceptions based on imagination.

We have seen that this early degeneration in the knowledge of anatomy was responsible to a very great extent for the effacement of surgery from the chapters of Ayurvedic medicine.

Physiology fared no better than anatomy. Owing to the want of proper insight into the internal structure of the different organs, the progress in the knowledge of physiology was handicapped to a very great extent from the very beginning. Even in modern times the science of physiology did not progress satisfactorily until the histology of the system was closely examined and clearly understood with the help of microscopes and other important instruments of recent origin. Although it is reported that the ancient scholars practised vivisection to study physiology, such a practice could not help them much, and their knowledge was mostly speculative and seldom based on experiments.

Surgical Cleanliness, i.e., Sepsis and Asepsis.—I next pass on to the consideration of another very important fact which failed to attract the notice of the ancient surgeons and made them pay a heavy penalty. I allude to the notion of surgical cleanliness as entertained by the Hindu surgeons. The idea of surgical cleanliness was not a separate entity in the minds of the ancient surgeons. They never cared to differentiate it from the conception of general neatness. To dwell upon this topic would involve a discussion upon the question of sepsis and asepsis which is certainly beyond the scope of this paper. I can only point out that success in surgery depends to a very great extent in modern days upon proper sterilization of instruments and the maintenance of aseptic conditions throughout and after an operation. The ancients seemed to have a very poor realisation of this fact. There are no records in which we can find indications of any method of disinfecting and sterilizing surgical instruments.

They believed in the genesis of disease by a disturbance in the equilibrium of the three govern-

ing factors of the system which are popularly known as *pitta*, *vayu*, and *kaph*. It never occurred to their minds that by employing improperly-cleaned instruments during surgical operations they were introducing into the system minute living germs which were capable of upsetting the balance of these humoral agencies and defeating the efforts of the surgeon. Even in modern surgery success was not attained until clear and definite notions on the subject of asepsis and sepsis were entertained and radical measures adopted to prevent and minimise the chances of sepsis creeping into the field of operation. It is this precaution which has enabled the Western surgeons to open up so boldly the abdomen or any other important cavity in the system with but little risk to life.

The rigid practices of preparation of the part, as practised to-day, were not followed by the ancients. All that they would do in certain cases before a surgical operation in a hairy region was to shave the skin clean and remove the hairs. Their failures and their disappointing results in major surgery—in spite of their good technique and accurate observation—were, I firmly believe, for the most part due to the negligence and carelessness on the part of the Hindu surgeons in cleaning their surgical instruments.

Failure to control Hæmorrhage.—The third important weak point in the domain of Hindu surgery which I bring to your notice was the control of hæmorrhage. To check excessive bleeding is quite as important as any other matter during operation, for if the hæmorrhage is left uncontrolled it may itself bring about the death of the patient. Susrut had enumerated four different modes of arresting hæmorrhage which were as follows:—

1. By the use of astringents,—*Sandhan*.
2. By the application of cold,—*Skandan*.
3. By improving the coagulative power of the blood,—*Pachan*.
4. By means of the cauterly,—*Dahan*.

Vag Bhat I is reported to have advised the use of goat's gut for ligaturing veins during venesection. It will be evident that these methods are certainly useful, practical, and readily applicable for arresting bleeding from most superficial wounds, but when the blood gushes out of a deep artery, ligature is the only method that can be relied upon. This method must also have failed on many occasions because in olden times there were no artery forceps or clamps which would help the surgeons in securing blood-vessels and tying them. The cauterly, though potent in its effects, had after all only a limited utility.

If these were the methods at the command of the Hindu surgeons for checking hæmorrhage they certainly shed some light upon the limitations of surgery of those times. The Hindu surgeons either did not attempt deep surgery or if they were called upon to deal with a severe case they had to work at a considerable disadvantage. This is borne out by the fact that Lord Buddha forbade the use of the knife within

an area of 2 inches around the anal orifice—an area which includes practically all the important blood-vessels of the region. It was also probably one of the reasons why laparotomy and lithotomy were not favourite operations with the ancient surgeons.

Problem of Anæsthesia.—Finally I touch upon the problem of anæsthesia which greatly handicapped the ancient surgeons in their proper pursuit of the profession. The Hindu writings are absolutely silent on this point. Even up to the time of Susrut mention is not made of any drug known to surgeons which could help them in anæsthetising the patient. Although Susrut himself did feel the necessity of producing insensibility to pain in his patients before a severe surgical operation he was not able to discover or achieve anything which could fulfil his desire.

As a matter of fact the patient was tied and secured firmly with a rope and deeply narcotised by Indian hemp, opium, wine or some other such intoxicating drug. Wine was mostly the remedy of choice for this purpose as it also helped the patient in withstanding the shock of the operation afterwards. It is terrible and most revolting to the sense of humanity to read the dreadful accounts of the great human suffering which the patients experienced during an operation in bygone ages. In the history of modern surgery we also come across events of this nature. The difficulties encountered by Jenner in promulgating and establishing his discovery—vaccination—were very great. He was actually pursued and pelted with stones as he walked in the streets. The practice of vaccination was denounced by clergymen as diabolical murder. It is then not surprising to note that the people at all times in different countries have dreaded the surgeon's knife.

In "Bhoj Prabandh," a record of some repute, written by Pandit Bhallala in 527 A.D., we read an interesting account of a cranial operation performed by two brother surgeons upon Raja Bhoj himself. It is reported that they used a drug known as *sammohini* which made the king insensible before the operation. When this was over and they had applied a healing balm to the wound they administered another drug known as *sanjivani* which restored the royal patient to consciousness.

It is thus some 1,000 years after Susrut that we are first able to trace indications of any successful employment of a soporific agent. It is certainly creditable that some of the Hindu surgeons succeeded in acquiring knowledge of such medicaments. Such a method, however, was not of widespread application like the practical method which we use to-day.

Records are absolutely wanting regarding any mention of administering an anæsthetic by inhalation before the operation. The discovery of the use of chloroform, ether, laughing-gas, cocaine, butyl and other similar drugs for pro-

ducing general or local anæsthesia suitable to the requirements of a case has filled up a long-felt necessity which has retarded from time immemorial the practice of advanced surgery.

Hypodermic Medication.—I have given some account of the instruments used and the materials of which they were made of. It would mean undue prolongation of this paper if I were to try to include also the different modes of administering drugs to the patients. Here I only wish to make a few passing remarks upon the methods of intravenous and hypodermic medication. The intramuscular or intravenous injection of drugs is a novelty of the Western methods but although they never used a needle and syringe, hypodermic medication was also practised by the Eastern surgeons. They scarified the skin and rubbed the medicine into it.

My object in bringing these facts forward is only to expose the truth that, although the Hindus were the originators of the art of surgery, yet those who still follow their teachings strictly are entirely ignorant of this science at the present day.

Conclusion.—We must give up the evil practice of extolling the merits of the old and under-rating the value of new discoveries and inventions. We must rather learn to revere the old and to appreciate the new.

It is laudable that the ancient physicians had a good knowledge of the curative value of an immense number of herbs and drugs which they utilised in crude form for healing the sick, but along with this we must also pay a tribute to the present generation, not only for the proper study of pharmacology, but also for the efficiency of the pharmaceutical processes by which we are now able to extract active ingredients out of the crude material and standardise our preparations. The failure to do this is one of the shortcomings which still exists in the pharmaceutical processes of Eastern science.

It is praiseworthy that the armamentarium of the Hindu surgeons consisted of a good number of surgical instruments devised for a good number of operations of a different nature, but it is also demanded of us that we should appreciate how the followers of the western medical science have remodelled and extensively enhanced the paraphernalia of the older surgeons and placed it on a still sounder basis. What the ancients called an art, they have developed into a science.

Surely the success of modern days has been evolved out of the past, but the claim that our medical ancestors were omniscient and that there has been no real progress is unwarranted. We must take a more liberal view and should not be so short-sighted. This short-sighted policy has ruined us and will ruin us all the more if we do not give up entertaining such prejudices.

This spirit of conservatism has made all our knowledge stagnant and stationary, and this staleness has not been confined to medical science

alone; its painful influence has also been extended to different branches of other sciences. If I may be permitted to digress I should like to state that we ought to praise the ancient originators of the sun-dial which is a durable, accurate, and perfect time-keeper; it certainly displays in its construction the highest mathematical skill of the ancient astronomers in calculating the time from the movements of the heavenly bodies. But at the same time we must also give the credit due to the western invention of clocks and watches suitable to every purpose, time and occasion, as after all the sun-dial in spite of its accuracy and ancient history has a limited utility. We must admire the ancient inventor of the bullock cart and the chariot for the right grasp of the principles on which the construction of the vehicle is so much dependent, but along with this we must also acknowledge the superiority of Western knowledge in making an elaborate use of those principles which have resulted in the production of so many quick and rapid means of conveyance, not to mention the more wonderful achievements accruing from the study of the physical forces of Nature, namely, heat, light, electricity and magnetism by the Western peoples.

The Ayurvedic system is still the cheapest of the indigenous methods of treatment, and suitably adapted from time immemorial to the needs and constitution of the Indian people. Though seldom protected and befriended by the different foreign governments that dominated India, the ancient system has always commanded the respect and support of the indigenous people in general, and this is indeed an important reason for its inherent greatness. But it is most disappointing to note that while other sciences are improving and making new discoveries, Hindu medical science in spite of such widespread popularity and public appreciation should be so stale and unprogressive.

Further, the art of medicine is never complete without the art of surgery. In past and present days surgery has always played an important rôle in the time of wars. Much of the military strength of a people depends upon the efficiency of the surgical aid and medical treatment accorded to the wounded soldiers in the field. Even in modern times the members of the Indian Medical Service really constitute the backbone of the Indian military services. It is gratifying to note that many of the recent developments in the art of surgery are often introduced in times of war by expert army surgeons who, armed with every facility and with good resources at their disposal, have the greatest chances of exhibiting their ingenuity and skill in healing the sick and the crippled bodies of soldiers.

Amidst such facts it is very painful to observe that our pioneers of Ayurvedic and other systems should be deprived of the knowledge of that important part of medical science without which they are at a considerable disadvantage in render-

ing any valuable service either to the country or to humanity in times of war and need.

Now if we are to hope that our medical science shall once more rise to the position which it had the honour to enjoy in the past, we must try to modernise our system and to make up this long-felt deficiency in surgery in the Ayurvedic system.

When I speak of modernisation I do not mean to suggest that we should actually imitate the Western methods, but I do wish that we could imbibe the spirit which permeates the Western system of study. I wish we could inculcate in our Ayurvedic physicians the zeal for work, the spirit of research and the systematic collection of observed facts which is so characteristic of the Western scholars. I am certain that if we could work with that enthusiasm and try to develop our science on these methods, our Hindu medical science would soon be brought to a footing when it could boast, like other sciences, of making new inventions and discoveries.

Here I should like to sound a note of warning to such of my professional brethren as tend to adopt an attitude of indifference and apathy towards the Ayurvedic system. They may remember that the Ayurvedic system of medicine has stood the test of time and has persisted in spite of all the hindrances and obstacles that came in its way. Western medical science has yet to undergo such an ordeal and prove its stability and strength. There is a fund of solid truth still stored in the Ayurvedic books and it is for us to explore that treasure. The opinions and conceptions of Western scientists are still in a state of rapid flux and their way in spite of such progress is not so smooth as one might imagine it to be. Though the surgeons of modern times can claim to know the correct use of the knife, the stage of judgment of declaring precisely when not to use a knife has yet to be reached.

A Few Practical Suggestions.—It is the work of an educationist to formulate a working scheme for introducing improvements into the methods of imparting medical education in the Ayurvedic schools and colleges. It would be a hopeless and a fruitless attempt on my part if I were to do so. But as Jaipur is one of the centres of ancient learning and has an Ayurvedic college, I cannot dismiss the subject without making one or two practical suggestions regarding the study of anatomy which the medical authorities have introduced into their institutions. When we aim at introducing surgery we cannot possibly do this on a rational basis unless we also realise thoroughly the respective value of the allied subjects, a knowledge of which makes such a healthy and fruitful impression on the mind of students.

If we mean to teach our students anatomy and physiology it is necessary that we should also make some suitable arrangements for a preliminary course of study in biology. The establishment of a biological department under a competent head is a great desideratum.

It is gratifying to note that the medical authorities of the Ayurvedic College, Jaipur, have introduced into their institution many of the modern anatomical specimens and physiological charts to facilitate the study of anatomy and physiology. But it will be more advantageous to Ayurvedic medical students if they are allowed to attend the pathological post-mortem examinations held at the Mayo Hospital and are also given there practical demonstrations on anatomy, until proper arrangements are made for dissection in the institution itself. This will not only help the students in learning practical anatomy but will also enable them to pick up some knowledge of the pathology and morbid anatomy of different diseases. Along with this I would further like to point out that we should also now recognise the value of the many important instruments of clinical interest and try to introduce them into our institutions. Thereby we shall extend the scope for clinical work and begin to systematise our science of pathology on a practical basis.

With this unbiased and critical survey of the subject perhaps I may be accused of putting an uncharitable construction on the success of the ancient Hindu surgeons and their art. I am confident I have not made any such misconstruction but if I am considered guilty of rendering one I offer my sincerest apologies for the same. I can assure you most emphatically that I take as much glory and pride in the ancient learning as any of you, who have assembled here to-night, can claim to do.

When the object of all medical sciences and medical systems of treatment that prevail at the present time is to prevent and alleviate as early as possible human suffering, I pray that a time will come when we can sink all our differences as followers of one particular system. It is my sincere desire that we shall meet with this common object upon a common platform adopting the common appellation of medical scientists and stand beneath a common flag.

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INFANTILE CIRRHOSIS OF THE LIVER.

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FROM time to time appeals have appeared in the *Indian Medical Gazette* for information regarding the diagnosis, treatment, and prognosis of "infantile liver".

During the last seven years, 63 advanced cases of this disease, which I prefer to call

intercellular hepatic cirrhosis, have passed through my hands, and I have been able to watch the results either directly or indirectly. Of these 63 cases, 27 have been European or Anglo-Indian children, 30 have been Hindus, and 6 have been Mohamedans. In all these cases the children have ranged in age between 5 months and 3½ years; 17 children were on the breast, and in 12 out of these 17 cases the mother was a multipara. In all the remainder, the children, though temporarily on the breast, were suffering from obvious dietetic errors; for instance, 33 children were being fed on patent foods supplemented with sweets, *jellabis*, *rosagallas*, or any other fanciful food-stuff which a distracted mother may give to a peevish child in order to keep it temporarily quiet.

It is not therefore to be wondered at that the digestive system of the child mutinies, and additional work is thereby thrown upon the excretory functions of the liver, which at first enlarges due to swelling and congestion of the cells (the result of toxins), and in the final stages contracts in consequence of the reactive intercellular fibrosis.

My own views as regards the ætiology of this disease are as follows:—

(1) If a mother feeds incorrectly before the birth of her child she may predispose her infant to develop this disease, for, if it be accepted as a fact "that the vitamins are to the endocrines what the endocrines are to the economy," it will readily be understood that if the mother's diet is deficient in vitamins, she will not only influence and diminish the quality of her breast secretion, but will also influence the endocrine system of the foetus *in utero*, which as has now been proved, commences to function between the 8th and 20th week of foetal life.

(2). A nursing mother frequently suffers from pyorrhœa, anaemia, or constipation resulting in, or the result of, auto-intoxication. The consequence of this is that the baby obtains a supply of milk from its mother lacking in stimulatory hormones, calcium, iron, phosphorus, iodine, etc.—such defects culminating in intestinal and hepatic derangement in the infant.

(3) An infant reared on patent foods, or given indiscriminate articles of diet by its parents, is the one most frequently seen, and I think the explanation is obvious, for many of these children are *overfed* and the liver, pancreas, and intestinal glands are taxed to such a degree that the inevitable toxæmia or cirrhotic liver occurs. For instance, it is no uncommon thing to hear that a child has gone off its food and is being given cod-liver oil, olive oil, cream, ghee, lumps of sweet or chocolate, etc., in order to encourage or

persuade it to eat, although its tongue is dirty and its stools indicate that there is an upset of the metabolism and more particularly of the glycogenic function of the liver. As a result of this hepatic toxic irritation there is hepatic inflammation with consequent enlargement, and if the condition is neglected the child goes from bad to worse.

(4) Another feature in the ætiology must not be forgotten, and that is that during many months of the year in India cows particularly, and less often goats, are fed on dry fodder and are unable to graze properly because the grass has dried up. The consequence of this is that the cow's or goat's milk fails to contain those adequate and normal quantities of salts and endocrines which are necessary to the infant, if it is fed on boiled cow's milk.

Symptoms.—The first thing that I should like to lay stress on is the fact that this disease is one of insidious onset, and that in minor degree it occurs more frequently than is generally supposed. Fortunately, however, mothers and doctors are gradually beginning to realise that when a child goes off its food and becomes flabby and peevish it is Nature's own effort to cure the child by rest and starvation.

Scores of times I have seen, in consultation, European children with such symptoms for whom nothing more was necessary than strict limitation in diet and semi-starvation for a week or ten days with gentle saline laxative treatment. On such lines the slightly tender enlarged liver has retrogressed and Nature's own method of cure been aided. The old maxim "You have to get worse to get better" is a useful line of argument in such cases, for no child or animal is the worse for a week's semi-starvation.

The early symptoms are low fever almost continuously, accompanied by constipation with earthy or putty-coloured offensive stools. The child has no appetite and peevishly refuses all food. It sleeps restlessly and often lies upon its stomach. The urine is scanty and high coloured, and contains indican and acetone. The mother will tell you that the infant is losing weight, that its muscles are flabby, and its face sallow and anæmic.

Signs.—The liver will be obviously large to start with, perhaps 3 or more inches below the costal margin, and the child will cry when you palpate it. The spleen, in the early stages, is not enlarged, but later becomes easily palpable. The conjunctivæ look muddy coloured, and in the late stages of the disease there may be actual jaundice. The skin is dry and inelastic, and frequently there is œdema of the feet. In the last and hopeless stages the liver seems to recede, and there may be marked ascites.

A typical blood count taken from one of these cases, aged 7 months, is as follows:—

Red blood cells . .	.. 4,000,000
White blood cells	.. 8,000
Hæmoglobin	.. 70 per cent.
Polymorphonuclears	.. 27 " "
Lymphocytes	.. 65 " "
Large mononuclears	.. 7 " "
Eosinophiles	.. 1 " "

No parasites found.

Stool examination in all cases has been negative, except that bile salts and pigment and excess of fat have been present with undigested debris. No ova or abnormal cocci or bacilli have been found on plating.

The diagnosis is as a rule perfectly easy, and in no case of mine has the possibility of kala-azar, syphilitic liver, or malarial cirrhosis been neglected in the examination. Indeed most of the cases that I have seen in consultation have already been treated with quinine or its derivatives, or with a prolonged course of grey powder,—that poor panacea for all evils, beloved of mothers and doctors!

In my opinion there is only one condition which might give rise to error, and that is infection with one of the typhoid group of organisms, but with this you would have high fever with more or less an acute illness, whereas infantile intercellular cirrhosis is a disease of gradual onset and progressive debility over many months.

One final word of caution is necessary however in making the diagnosis and that is, do not stamp the disease as rickets, for, although from the ætiology, this disease, like rickets, is a metabolic deficiency one, if you hint to the parent that the condition is due to rickets it is a thousand to one that nurses, friends, or an outside doctor will tell the parent to put the child on to cod-liver oil, Ostelin, Virol, or other vitamine A product before the baby is able to digest it and while its tongue is still dirty, with the result that Pelion is piled upon Ossa and fatal vomiting and coma may occur within a few weeks or even days.

Treatment.—If the ætiological factors are understood the treatment of these cases, provided that they are seen early enough and before ascites or anæmic œdema occur, is successful in 70 per cent. of cases.

(1) Prevention. A mother, during the ante-natal period, must be fed properly, and the following diet for all pregnant mothers is recommended, with the addition if need be of cod-liver oil, and Parrish's Food for anæmia or diminished calcium content.

Cereals.—Oatmeal porridge or any of the breakfast foods, with milk. Brown or wholemeal bread, toast, rusks, cream cracker biscuits.

Vegetables.—Any vegetable in any form except fried.

Fruits.—Any fruit either fresh or stewed.

Meat.—Beef, lamb, mutton, veal, not at all or only very occasionally. Pork never. Curry never.

Chicken (avoid duck, goose, game).

Croquettes or rissoles if not fried in deep fat.

Eggs.

Fish.—Any fish except salmon, mackerel, hilsa.

Soups.—Any soup, thick or clear, but free from fat.

Sweets.—Any jam or jelly, marmalade or honey, but pure honey is best of all.

Milk puddings. Boiled puddings occasionally.

No pastry, no cakes.

Salads.—Any salad, but sparingly of salad dressing.

Fluids.—Water, aerated water, home-made lemonade, orangeade, weak tea, coffee, milk if desired.

No alcohol of any kind.

Butter may be taken if desired, but not in large amounts. Cream, fat meats, and any fish fried in deep fat should be avoided. Fruits and vegetables must be taken at least twice a day, and meat, if at all, not more than once every other day. Mild cheese, such as St. Ivel's, is permissible.

(2) During lactation, the mother's diet should be on the same lines, the idea being to increase the calcium, iron, potassium, phosphorus, iodine, salts, etc., and also the hormone content of her secretion. If the mother is anæmic or a multipara, encourage her to take cod-liver oil or Ostelin, together with Parrish's Food. A healthy wet-nurse may mean salvation in infants under 1 year.

(3) When weaning occurs, see that the food supply of the cow or goat is, or has been correct, that is that green fodder is and has been provided. It is for this reason that in India I so particularly urge that goats should be kept, for they can be supervised, fed properly, and milked easily and cleanly.

(4) Avoid giving patent foods, sweets, chocolates, *jellabis*, *rosagallas*, ghee, or other rich articles from the table. Remember that monosaccharids such as honey and ripe sugar-cane are digestible, but all disaccharids, such as sweets, etc., are indigestible and therefore are not permissible.

(5) No child should have less than 2 to 3 ounces of fresh fruit juice per day, oranges, pineapples, tomatoes, mangoes, grapes, and pomegranates are easily obtainable all over India.

(6) All children, European or Indian, should be allowed out in the sun from 6 to 9 a.m. and 3 to 6 p.m.—that is when the ultra-violet rays of the sun are at their maximum. If possible a course of 10 to 20 exposures to ultra-violet rays from a mercury vapour quartz lamp is most beneficial.

(7) Remember that chicken broth is no food but merely a purin stimulant. Vegetable soup on the other hand, made as in France of fresh green vegetables boiled for no more than 15 minutes, contains vitamine C and phosphorus, sodium, potassium, iron, calcium, magnesium, and iodine; but in Bengal and India generally owing to the poverty of the soil, vegetables contain smaller quantities of these salts, especially iodine, than in Europe. It is, therefore, best to follow the example of those who live in the valley of the

Mississippi and add iodised salt to all food. An easy method of doing this is to purchase "Iodosol" which is a ready prepared iodised salt sold by all leading chemists.

Actual Treatment.—Keep the child in bed and unclothed in the sun, or, if well enough, let him run about in the sun semi-naked at the hours stated above; and bear in mind that the absolute essential of the following treatment depends upon a fat-free diet which relieves the overworked and congested liver.

1st Day.—Give only barley-water, or rice-water, sweetened if need be with $\frac{1}{4}$ grain of saccharine to the pint.

2nd Day.—Begin the skimmed milk treatment,—that is fat-free milk.

The easiest way of making skimmed milk is to take a small enamel douche can, insert a cork in the tube outlet, and simmer therein fresh milk for half an hour; then remove and place on ice or in a cool place for 2 to 3 hours. The fat of the milk will by then all have risen to the top, and the lower two-thirds in the vessel can now be obtained by removing the cork from the outlet and letting the milk run into a clean jug. This (lower two-thirds) milk is to all intents fat-free and should be given diluted 1 in 3 to start with, gradually increasing its strength.

As regards the quantities to be given, remember the law that an infant requires not more than $1\frac{1}{2}$ ounces of milk per pound weight per diem in order to maintain life. For instance, a child aged 9 months was brought to me with typical signs and symptoms of infantile hepatic cirrhosis. Its weight was 12 lbs., that is, it must have 18 ounces of milk per day, and the following directions were given:—Skimmed milk 2 ozs., water 6 ozs. Feed three-hourly.

3rd Day.—Skimmed milk $2\frac{1}{2}$ ozs., water $5\frac{1}{2}$ ozs.

4th Day.—Skimmed milk 3 ozs., water 5 ozs.

5th Day.—Skimmed milk $3\frac{1}{2}$ ozs., water $4\frac{1}{2}$ ozs.

6th Day.—Skimmed milk 4 ozs., water 4 ozs.

7th Day.—Skimmed milk $4\frac{1}{2}$ ozs., water $3\frac{1}{2}$ ozs. $3\frac{1}{2}$ hourly.

8th Day.—Skimmed milk 5 ozs.; water 3 ozs. $3\frac{1}{2}$ hourly.

9th Day.—Skimmed milk $5\frac{1}{2}$ ozs., water $2\frac{1}{2}$ ozs. $3\frac{1}{2}$ hourly.

10th Day.—Skimmed milk 6 ozs., water 2 ozs. 4 hourly.

11th Day.—Skimmed milk $6\frac{1}{2}$ ozs., water $1\frac{1}{2}$ ozs. 4 hourly.

12th Day.—Skimmed milk 7 ozs., water 1 oz. 4 hourly.

13th Day.—Skimmed milk $7\frac{1}{2}$ ozs., water $\frac{1}{2}$ oz. 4 hourly.

14th Day.—Pure milk. $4\frac{1}{2}$ to 5 hourly.

Rules up to the 14th day. (1) 2 to 4 ounces of fresh fruit juice to be given between meals. (2) Keep the teeth and mouth clean. (3) Allow as much water in between meals as desired, but no aerated waters or sugared waters. (4) On

the 4th day add a teaspoonful of Mellin's (Dextrimaltose) to each feed. On the 7th day $1\frac{1}{2}$ teaspoonful of Mellin's (Dextrimaltose). On the 10th day 2 teaspoonful of Mellin's (Dextrimaltose) per feed. On the 14th day $2\frac{1}{2}$ teaspoonful of Mellin's (Dextrimaltose) per feed. (5) The bowels must be opened daily, and if possible twice daily, by giving milk of magnesia and paraffin, of each one teaspoonful. (6) If you desire to give a cholagogue, 3 grains each of atophan, German Carlsbad powder, sod. salicylate, with or without $\frac{1}{2}$ gr. of hydrarg. cum creta, will be found efficient at bedtime or twice a day.

I have found benefit also from rectal douches of potassium permanganate 1 grain (B. W. tablets) dissolved in a pint of water, given slowly, b.d. with funnel and catheter.

From the 14th to the 21st day the child is kept on pure skimmed milk with Mellin's (3 teaspoonfuls), and following the above rules it may also have Mellin's or Allenbury's rusks.

On the 21st day give skimmed milk 7 ozs. Ordinary milk 1 oz., $4\frac{1}{2}$ -5 hourly.

22nd	"	"	"	$6\frac{1}{2}$	"	"	"	$1\frac{1}{2}$	"	"	"
23rd	"	"	"	6	"	"	"	2	"	"	"
24th	"	"	"	$5\frac{1}{2}$	"	"	"	$2\frac{1}{2}$	"	"	"
25th	"	"	"	5	"	"	"	3	"	"	"
26th	"	"	"	$4\frac{1}{2}$	"	"	"	$3\frac{1}{2}$	"	"	"
27th	"	"	"	4	"	"	"	4	"	"	"
28th	"	"	"	$3\frac{1}{2}$	"	"	"	$4\frac{1}{2}$	"	"	"
29th	"	"	"	3	"	"	"	5	"	"	"
30th	"	"	"	$2\frac{1}{2}$	"	"	"	$5\frac{1}{2}$	"	"	"
31st	"	"	"	2	"	"	"	6	"	"	"
32nd	"	"	"	$1\frac{1}{2}$	"	"	"	$6\frac{1}{2}$	"	"	"
33rd	"	"	"	1	"	"	"	7	"	"	"
34th	"	"	"	$\frac{1}{2}$	"	"	"	$7\frac{1}{2}$	"	"	"
35th	"	"	"	pure milk.							

The rules after the 14th day are the same as before, except that one should substitute one or two feeds with fresh vegetable or fish soup. The amount of fruit juice should be increased if possible; and I am in the habit, after the 14th day, of giving fractional doses of extract thyroidæ sicc., e.g., $1\frac{1}{8}$ gr. b.d. as it seems to fan up the dormant metabolism, and is, as McCarrison states, "as the draught is to the fire."

By this time the stools and general condition of the child, including its liver, will have much improved, and as progress continues the diet can gradually be increased, with due regard to any set-back which may occur and have its origin in some particular food substance.

When the tongue is clean and eyes clear, begin giving a quarter of the yolk of an egg per day in one of the bottles, gradually increasing to one whole yolk. Cod-liver oil may now be given either in 5 drop doses increasing to 15 drops t.i.d., or Ostelin 1 drop b.d. in honey or milk

for the first week; 2 drops b.d. for the second week; 3 drops b.d. for the third week.

Rice, butter or ghee, should be given sparingly for many months. European children should not be given meat or highly seasoned food substances. Fish roe and boiled fish or minced chicken or liver may be given gradually with advantage.

Prognosis.—Cases seen early, and the parents of whom are sensible and obedient to the written details of treatment which I have given, get well in the majority of cases in 6 to 10 weeks; but any lapse on the part of the parents or servants, catering to a peevish child's inordinate appetite or desire for some article of food not allowed, will tend to cause relapse.

Bronchitis, broncho-pneumonia, and skin diseases,—such as boils and intertrigo—are frequently serious complications. Late cases, jaundiced or with ascites, I have never known to recover.

NON-DILUTED MILK FOR INFANTS.

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THE object of this paper is not to go into the question of the feeding of infants, which is a very big subject, but only to consider the question "Whether milk (say cow's) for infants should or should not be diluted?"

The statements connected with this question will be considered, not in detail but superficially.

It is stated by some authorities that cow's milk is the proper food for the calf but not for the human baby owing to its composition differing from that of the human milk. It will be seen in the following table that cow's milk contains more proteids (curds), less carbohydrates (sugar), a trace less fats (cream) than the same quantity of human milk does:—

Average composition per 100 parts—(Notter and Firth).

	Human.	Cows.
Specific Gravity ..	1,027	1,032
Proteids ..	2.29	3.55
Carbohydrates ..	6.2	4.88
Salts ..	0.3	0.71
Fats ..	3.81	3.69
Water ..	87.4	87.17
TOTAL ..	100.	100.

It is stated by other authorities that the composition of cow's milk can be changed to that of human milk by the addition of water, sugar and cream in the required quantities—that is, this changed milk will contain the right constituents and the constituents will be in the proper proportion to each other as in human milk and it is considered as good as human milk and so it is called "Humanised Milk."

In practice this humanised milk may be suitable for infants with good digestions but it is not as good as human milk for infants with weak digestions or who are ill. The reason for this is that the curds which are formed in the stomach differ in the two milks. In human milk the flakes of the curds are thin and distinct from each other and easily digested by the gastric juice of the infant, whereas the curds of cow's milk are in large hard lumps which are digested by the gastric juice of the infant with difficulty, and much of the undigested curd is passed on into the intestine where it sets up irritation leading to malnutrition, vomiting, diarrhoea, etc.

To get over this difficulty it is the practice to boil the milk. The boiling, amongst other effects, is said to lessen the size of the curds, but really it does not make the size of the curds small enough to be digested easily by infants with weak digestions. On the contrary boiling "kills" the milk and also makes the milk more difficult to digest, especially for infants with weak digestions. Consequently this boiled milk in order to be made more digestible is further interfered with by the addition of an alkali or a thickening substance.

Alkalies, such as bicarbonate of soda or lime-water, to be given in sufficient quantities to counteract the acidity of the stomach so as to produce smaller clots of curds would greatly interfere with the digestion for some time, and yet to give smaller quantities would be useless. So they are not recommended for this purpose.

Thickening substances, such as barley or oatmeal water, are used with the object of getting mixed up with the curds so as to prevent the curds from being formed into a hard clot. Young infants do not possess any ptyalin to convert the starch of the barley or oatmeal into sugar and so the starch is carried on into the intestines where it causes irritation either mechanically or by fermentation with resultant bad health and perhaps diarrhoea and vomiting. These are not

recommended till the infant is able to digest the starch.

It is outside the province of this paper to consider the other treatments (e.g., peptonising), which cow's milk is put through for these infants with weak digestions.

The addition of water to the cow's milk (ignoring the addition of the sugar and cream) is really done with the object, as stated above, of reducing the percentage of the proteids (casein) so as to make the cow's milk more easily digestible. This has not been accomplished in infants with weak digestions as shown above. We have considered this to be due to certain causes and accordingly have tried to overcome them by certain measures but without success. Therefore there is some other cause for this.

Several years ago, I considered this subject and came to the conclusion that as human and cow's milk contained the same quantity of water the dilution of cow's milk for infants and especially for those with weak digestions was more harmful than beneficial. The water in the diluted cow's milk in the infant's stomach does not continue to dilute the milk, but it actually dilutes the gastric juice as it is being secreted and thus impedes the gastric juice from digesting the curds, which in large quantities pass on into the intestines with the harmful results already described.

The medical attendant usually instructs adults suffering from indigestion due to defective gastric juice not to drink fluids, including water, during and after meals for about an hour. Then why do not medical attendants tell the mother or nurse of an infant with indigestion due to defective gastric juice not to give water to the infant with a feed or for about an hour after a feed? On the contrary they actually tell them to dilute the milk with water in various proportions, such as 2 parts of cow's milk to 1 of water, equal parts of milk and water, 1 part of milk to 2 of water, and so on.

This procedure may be correct in infants with strong digestions as the drinking of large quantities of fluids at meals by adults with good digestion is all right, but it is not suitable in infants with weak digestions. This is the reason for many infants continuing indigestion for long periods, which may cause much suffering in other ways, provided death does not relieve them earlier.

Consequently I am of the opinion that if cow's milk has to be given to an infant it must be given *undiluted and in small quantities*. The quantity of the milk for each feed, the number of feeds, etc., depend on the weight and age of the infant and also on his or her capability of digesting the curds. If the conditions are favourable, the quantity of milk in the feeds is judiciously increased, the number of feeds in the twenty-four hours reduced and the interval between the feeds lengthened. On the other hand if the conditions are not favourable, the quantity is reduced

and it may even be necessary to stop giving the undiluted cow's milk and in its stead to give whey, albumen water or peptonised cow's milk and when the conditions become favourable to cautiously return to giving undiluted cow's milk.

In passing I may state that I am of the opinion that unboiled cow's milk is not only more digestible but also more nutritious than boiled cow's milk, and so I prefer to recommend the former undiluted to be given to infants provided of course that the milk is from a good sanitary source.

I have practised the above principles for several years with beneficial results.

A Mirror of Hospital Practice.

A CURIOUS PRELIMINARY "TREATMENT" FOR COUCHING FOR CATARACT.

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On the 11th April 1924 Govinda Rao, a Hindu male about 60 years of age, presented himself for treatment for cataract of both eyes. His left eye had been treated by a Mohamedan coucher at Bellary a few days before and was somewhat red and watery. On examination it was found that a suture with an ordinary cotton thread had been inserted into the left eye about a quarter of an inch to the left of the cornea, a little below the mid-line of the cornea and enclosing in its grip about quarter of an inch of conjunctiva and sub-conjunctival tissue. Two knots had been tied and the threads had been left about $1\frac{1}{2}$ inches long. There was a slight



inflammation around. Nothing had been done to the lens.

The patient gave the following account:—

The Mohamedan coucher was treating several patients for cataract and his method was as follows: On the first visit a few drops of a white medicine (? cocaine) were put into the cataractous eye; after about ten minutes the sound eye was covered and a suture applied to the affected eye with an ordinary needle and thread. Both eyes were then left open and the patient was told to visit the coucher once daily for three days. At each visit some drops were instilled into the affected sutured eye and some whitish liquid (? possibly a blister) applied to both temples and above the bridge of the nose, the size of a pin's head. On the fourth day the patient was taken to a room, a cloth was put over the heads of both patient and operator and in a few minutes the cataract was removed and the patient sent away with restored sight.

I report this case as the procedure is novel and probably calculated to enhance the prestige of the subsequent couching among the ignorant folk.

This patient whose photograph is given had run away after his first visit. He was operated on in the hospital and made an uneventful recovery.

A FOREIGN BODY IN THE RECTUS ABDOMINIS MUSCLE.

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Mission Hospital, Kalna.

THE patient, a Hindu female, aged 25, was first seen on the 2nd April, 1926, when she complained of pain in the left side of the abdomen. The pain had commenced three weeks before and was gradually increasing. There was no history of previous illness.

On examination the left rectus was found to be very tight, hard and tender to the touch in about $1\frac{1}{2}$ inches of its length just below and to the left of the umbilicus. Vaginal examination revealed nothing. The patient was advised to stay for observation as she was obviously having acute pain. She did not stay but returned a fortnight later and was then admitted. The pain was now much more acute, the patient being scarcely able to walk. On examination there was found a swelling about four inches long, very firm and narrow in the line of the left rectus muscle extending up to about $1\frac{1}{2}$ inches above the level of the umbilicus. Vaginal examination confirmed the diagnosis of a swelling in the abdominal wall. The patient had had no fever during the present illness and there was no sign of fluctuation to indicate the presence of an abscess.

During the following two days the patient had no fever and the condition did not improve at all under local applications of heat. She then consented to operation and it was decided to explore.

Operation.—An incision was made in the line of the swelling and the rectus muscle exposed and freed as far as possible. The swelling was found to be in the muscle, which was very hard and of a grey colour. Muscular striation was absent, the appearance being that of a solid tumour. The muscle was incised longitudinally and the same grey solid-looking appearance was found. On deeper incision the knife was felt to enter a cavity in the centre of the muscle. A finger was inserted and there was felt a foreign body. On extraction this proved to be a twig $5\frac{1}{2}$ inches in length and $1\frac{1}{6}$ inch in diameter, lying in the vertical line of the muscle with its centre just at the level of the umbilicus. There was no sign of pus but the twig had a very foul smell. The cavity had no connection with the abdominal cavity. The twig was recognised to be such as is used in India to produce abortion. The patient at first denied that she had ever been pregnant but on being shown the twig she gave the following history:—Three years previously she had been two months pregnant and abortion had been procured by the insertion of such twigs into the uterus. She had severe pain in the right side of the abdomen but that had cleared up in a month by the use of medicine. Since then she had had no illness at all until the commencement of the present trouble five weeks previously.

In view of the foul smell present and the condition of the muscle it was deemed advisable to leave the wound open and to treat it by hot dressings.

On the second day after operation pus was present and poured from the wound. This cleared up rapidly and the patient was discharged with the wound quite healed twelve days after operation. One presumes that the pus was caused by the presence of an aerobic organism which became active on being exposed to the air. I regret that it was not possible to culture the organism present at the time of operation.

One leaves it to the imagination to work out the course taken by the twig before it came to rest in the rectus muscle.

It is interesting to compare this case with that described in the *Indian Medical Gazette* of May 1926.

THREE CASES OF BRONCHIAL SPIROCHÆTOSIS.

By J. E. LESSLAR,
and

K. KANAGARAYER, D.T.M. (Bengal),
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Kuala Lumpur, Federated Malay States.

To the practitioner in the tropics who makes frequent use of the microscope, infection by the spirochæte of Vincent is becoming a problem of

increasing interest. This spirochæte, in association with the fusiform bacillus, presents itself in many different conditions involving mucous membranes and raw surfaces. It may supervene as a secondary infection in ulcers and wounds of the skin, and as a sequel to amœbic ulceration in the gut. In the mouth and throat it is responsible for well-defined infections such as Vincent's angina, glossitis and stomatitis. Apparently in most cases Vincent's infection is comparatively mild, but it may give rise to great destruction of tissues as in *ulcus tropicum* and Naga sore—(Knowles, 1923)—in India. When the bronchi are involved, either as a primary infection as in the three cases recorded here, or as an extension from a focus in the mouth or throat it forms a distinct clinical entity; the disease may run a long course with exacerbations at irregular intervals and it is difficult to eradicate it entirely. From clinical and microscopical findings there are reasons for regarding the three cases recorded below as cases of primary infection of the bronchi with Vincent's spirochæte and the fusiform bacillus and for concluding that the disease may be identical with the bronchial spirochætosis of Castellani (Castellani and Chalmers, 1919). In a case of gangrene of the right lung and extensive cellulitis of the neck and chest wall following sepsis in the mouth which recently came to post-mortem examination large numbers of Vincent's spirochætes and fusiform bacilli were seen in smears from different parts of the gangrenous lung and from the mouth and chest wall.

DESCRIPTION OF CASES.

Case 1.—A Tamil woman, 19 years of age, of normal development and nutrition, complained of cough, severe pain in the sternal region and hæmoptysis which came on suddenly a fortnight previously. When first seen by one of us in consultation with her medical practitioner, her good state of nutrition and the afebrile course of the disease on clinical grounds ruled out pulmonary tuberculosis, which was suspected though no tubercle bacilli were found in her sputum. She was expectorating large amounts of frothy blood-stained glairy sputum in which were floating small whitish flakes of tissue. These flakes resembled the whitish patches which we have seen in Vincent's infection of the throat and in a case of glossitis which recently came for examination. They are like diphtheritic patches with the difference that they are easily swabbed off. Physical examination of the lung revealed nothing except a few wheezing rhonchi as in an asthmatic lung. The gums, mouth and throat presented a normal appearance.

On microscopic examination of the sputum, large numbers of spirochætes and fusiform bacilli were seen under dark-ground illumination and by Fontana's and Giemsa's stains. The spirochætes were of different lengths varying from about 7μ to 18μ with loose open spirals 2 to 7 in number. The fusiform bacilli are stated to be (1911) and they were seen to be so in fresh smears in the second and subsequent examinations of the sputum of this patient and the other two cases. In the first examination of the sputum of this patient, however, the fusiform bacilli were seen to be progressing forward with a graceful undulating movement and was specially looked for in the subsequent examinations but was not seen again. The fusiform bacilli were of

different lengths and forms. Some were pointed at both ends and slightly incurved; others, especially the long forms, were blunt at one or both ends; a few, especially the young forms, were seen lying end to end. They varied in length from about 5 μ to 20 μ ; Giemsa's and Leishman's methods of staining brought out the metachromatic granules well.

After more than four week's treatment with iodides and arsenic by the mouth the patient so far recovered that the cough and hæmoptysis ceased. Bi-weekly examinations of the sputum were made and each time spirochætes and fusiform bacilli were demonstrated, though in rapidly diminishing numbers. The sputum for examination was always obtained after gargling the throat and mouth every five minutes for an hour.

Case 2.—A Tamil labourer of robust constitution was admitted to the District Hospital, Kuala Lumpur with a history similar to that of Case 1. The complaint started ten days previously. Physical examination of the lungs revealed no abnormality. The naked eye appearance of the watery blood-stained glairy sputum was characteristic, and immediately suggested Vincent's infection. He remained in hospital for over a fortnight but during the last four days of his stay no sputum was obtained.

In earlier examinations of the sputum numerous spirochætes and fusiform bacilli were seen.

Case 3.—A Tamil woman, 40 years of age, of rather poor physique, gave a history of cough of four years' duration. The illness at first confined her to bed for a few days, during which time she coughed up blood-stained sputum. The hæmoptysis ceased after a week but the cough never left her entirely. She has since had acute exacerbations two or three times a year but she was not ill enough to be confined to bed, nor was any blood noted in her sputum.

On examination of her chest, a few moist rales were heard. The mouth and throat were normal. A few spirochætes and fusiform bacilli were demonstrated in her sputum on three occasions. It is probable that spirochætes and fusiform bacilli would have been seen in much greater numbers during an exacerbation.

She is little troubled with the cough. She gave a history of having lost some weight since the illness began four years ago and her general health has since then not been good. Repeated examinations of her sputum for tubercle bacilli were made with negative results. This taken together with the afebrile course of the illness and the physical signs in her chest definitely exclude tuberculosis.

These three cases were seen in the course of a month, and there is reason to believe that Vincent's infection of the bronchi is much more common than is generally supposed. If they are looked for, more cases will certainly be recognised than hitherto. A more frequent recourse to examination of the sputum in fresh smears and by Fontana's method is desirable. We are inclined to ascribe the infrequent recognition of the disease in this country to the routine examination of the sputum by Ziehl-Neelsen and Gram's methods of staining only. These methods are satisfactory for demonstrating tubercle bacilli and Gram-positive cocci but do not stain spirochætes well.

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A CASE OF ACUTE PARENCHYMATOUS GLOSSITIS.

By GOPAL SINGH CHAWLA, M.B., B.S.,
39, Temple Road, Lahore.

A YOUNG Sikh girl, aged about 14 years, was brought to me on the night of the 3rd June, 1926, with very acute inflammation of the tongue. The history given was that about 8.15 that evening when taking her evening meal, and about to consume the last morsel of it from her hand, she had suddenly felt acute pain in the tongue. Her mother thought that the girl had probably bitten her tongue and advised her to finish her meal and go to bed. She did so immediately but the swelling of the tongue increased and her parents brought her to me the same evening.

I found the whole of the anterior half of the tongue acutely swollen, tense and painful. On my enquiring as to the nature of the evening meal which she had taken I was told that it consisted of *mong ki dāl* (a special grade of pulse); onions and *chupatties*. I was told, further, that the other members of the family had partaken of the same meal and had had no symptoms.

I examined the tongue very carefully but was not able to find any tooth marks or any trace of insect bite. As it was rapidly swelling in size, I painted it with (rectified) tincture of iodine and made two incisions down the dorsum and two on the under surface. The rapid swelling of the tongue now ceased, but it did not revert to its normal size until next morning.

Can any readers of the *Indian Medical Gazette* suggest a diagnosis for a case of such rapid onset?

(Note.—Possibly a case of bite from some insect in the food; possibly a case of giant urticaria of sudden onset? Editor, I. M. G.)

A CASE OF INFECTION IN AN INFANT WITH *GIARDIA* (LAMBLIA) INTESTINALIS.

By K. L. BASU MALLIK, M.B.,
Chief Medical Officer, Ludlow Jute Co., Ltd., Chengail,
Howrah.

ON the 15th July, 1925, S. K. B., a Hindu male baby, one year old, bottle fed from two months of age, in a delicate state of health and a frequent subject to milk indigestion was suddenly taken ill with fever, 103.4° F.; vomiting and diarrhoea. The baby was acutely ill, was restless and slept intermittently. Vomiting was occasional and at first consisted of undigested milk and stopped as soon as the stomach was empty of its contents. The fever ranged between 103° and 104°. The diarrhoea was on the increase. Physical examination revealed a slightly coated tongue and chronically enlarged tonsils. Heart, lungs, liver, spleen, ears—were found normal. The blood showed a total leucocyte count of 14,500 and no malarial parasites could be found in the films.

A diagnosis of acute intestinal indigestion was made and the baby was put on a mixture containing sodii sulphas and sodii bicarbonas.

16th July.—The diarrhoea went on increasing to about 4 or 5 stools per hour and the character of the stools was watery, whitish or glairy, and mixed with thin mucus, and practically inoffensive. The temperature began to come down and at the end of the second day was 101°. The eyes were sunken and signs of great

thirst were shown. Further dehydration of tissues was prevented by giving copious drinks of iced normal saline sweetened with saccharin. The sulphate mixture was cut off and bismuth oxy-carbonate in 20-grain doses, was administered, but it was passed practically unaltered in the intestinal discharges.

17th and 18th July.—The diarrhoea was further aggravated and it was not possible to count the number of stools. The temperature, however, came down to normal on the fourth day.

19th July.—On this fifth day, prior to sending the stool for bacteriological examination to a Calcutta pathological laboratory, I took a piece of mucus from a napkin and smearing it with a little normal saline tinted with methylene-blue, examined it, and found a very large number of quickly-moving pear-shaped bodies (*Giardia*), whipping around in all directions in the microscopical field. A small amount of the intestinal discharge was collected from the napkins and sent to the Pathological Laboratory of the Medical College, Calcutta, where my findings were confirmed by Dr. M. N. De, M.B., by the detection of a large number of *Lambia intestinalis* in its encysted as well as vegetative stage.

Accordingly the baby was put on to 1-grain doses of stovarsol every 4 hours. Within the first 24 hours the number of evacuations was reduced from 4 or 5 per hour to about 1 per hour. During the second 24 hours there were 4 movements of the bowel, the watery consistency had disappeared and the normal colour of the stool was returning. During the third 24 hours semi-solid stools of yellow colour were being passed the patient developed a tremendous appetite, and soon made an uneventful recovery. Examination of the stools after a week's treatment failed to show any cysts.

The points worth noticing in this case are:—

- (1) *Lambia intestinalis* as a cause of acute intestinal indigestion in infants.
- (2) The magical effect of stovarsol on these organisms.
- (3) The importance of microscopic examination of the stools in every case of infantile diarrhoea.

So far as one can ascertain *Giardia intestinalis* as a cause of intestinal inflammation is not recorded. It is said to be a non-pathogenic flagellate parasite in man less frequent than *Trichomonas* and *Chilomastix*, and present in about 20 per cent. of healthy children in America and in 5 per cent. of troops in the American army (Kofoid).

REFERENCE.

Maxey, K. F., 1921. *Giardia intestinalis*, a common protozoan parasite of children. *Johns Hopkins Hospital Bulletin*, XXXII, p. 1721.

(Note.—Although *Giardia intestinalis* was present, other possible causes of the enteritis do not appear to have been excluded. Many workers claim that it is pathogenic to man, but proof has not yet been provided. Hegner and Taliaferro in their "Human Protozoology"—1923—note the special frequency of *Giardia* infection in young children.—Editor, I.M.G.).

A CASE OF COMPOUND FRACTURE OF THE HUMERUS TREATED BY A SIMPLE METHOD.

By MD. HASSAIN ABDUL RAZAKH SOUDAGER,
Medical Officer, Raeburn Dispensary, Dharwar District.

A HINDU boy, aged 12 years, was brought to this dispensary in a cart from a village 16 miles away. He had been thrown out of a bullock cart and his left humerus was fractured at its upper third, the distal end of the fracture protruding through the soft parts and causing an irregular wound, $1\frac{3}{4}$ inches in diameter. Before bringing him to hospital the cartman had pushed the protruding bone back and had bandaged the part with a dirty rag, at the place of the accident.

On admission the wound was thoroughly cleaned and dressed with tincture of iodine. The fracture was reduced and put up on an internal angular splint with three side splints. This method was found to be unsatisfactory, however, as the fracture assumed an angular position by the next morning, chiefly owing to the inadequate grip of the upper fragment by the splints and to the frequent movements of the fragments with every change in posture of the patient. Further, the latter condition was rendered worse by the increased weight of the lower part of the limb when splinted.

The internal angular splint was dispensed with on the fourth day after admission and a straight side splint substituted on the inner side. The arm, together with the forearm, was now brought down straight alongside the body and fixed in an immovable position to the body by a many-tailed bandage.

As a result of this the union was perfectly satisfactory in spite of the daily removal of the splint and bandages for dressing the wound. The patient was admitted on the 16th January, 1926, and the wound had healed within twenty-one days of admission. He was kept in hospital for a further six days and then discharged at the request of his mother, with the arm still in splints.

Noteworthy points about the case are (1) the healing of so septic a wound without complications, although exposed to gross contamination. (2) The complete immobilisation obtained by the simple procedure of bandaging the limb to the side, with no elaborate appliances needed. The side splints used were made from an ordinary packing case, as the official splints supplied by the Government Medical Store Depot are of uniform breadth and did not suit the case as their breadth remains uniform and does not decrease towards one end in proportion to their length.

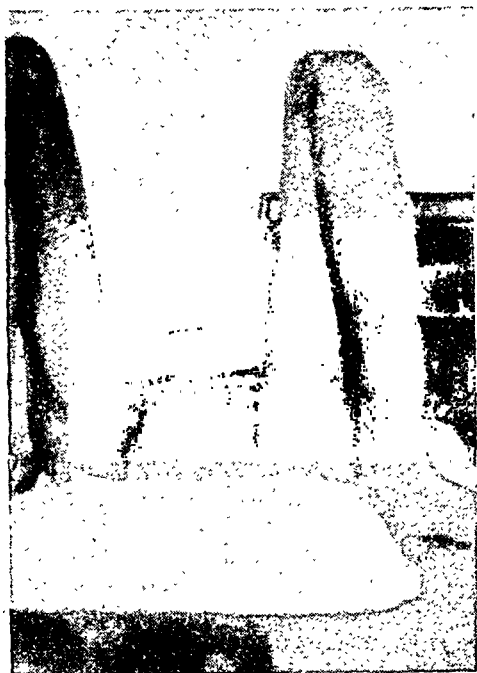
A CASE OF INTERSTITIAL FIBROID OF THE FUNDUS UTERI CAUSING ACUTE COMPLETE INVERSION OF THE UTERUS.

By A. C. BHARADWAJ, L.M.P.,
House Surgeon, King Edward VII. Hospital, Benares.
R., a widow, aged fifty years, was admitted to the King Edward VII Hospital, Benares, on April 8th, 1926.

Previous History.—She was a mother of four grown-up children, the eldest being thirty-three years old. Menstruation began at the age of thirteen and had been quite regular till seven years previously when she noticed for the first time that the catamenia were excessive. Some months later she felt a small swelling of the size of a lemon in the left side of the abdomen. This began to enlarge slowly and was accompanied by painful and excessive periods which used to last a fortnight or more, with intermissions of a month or so. The size of the swelling gradually reached to that of a moderate sized *bael* fruit. About three weeks previous

to admission, the patient suffered from an attack of fever which lasted for about fifteen days. Seven days previous to her admission to hospital she experienced very severe abdominal pain akin to bearing down pains, which lasted for about fifteen hours, and next morning the tumour came out of the vagina accompanied by profuse bleeding.

Condition on Admission.—The condition present on admission is shewn in the photograph.



Showing the fibroid with inverted uterus.

A hard mass, the size of a foetal head was found protruding from the vulva. The uterus was inverted and prolapsed so that no external os could be felt nor any sound passed beyond the vaginal canal. The whole mass was covered with foul sloughs, and maggots were wriggling over its surface. The diagnosis of inversion of the uterus was confirmed by the fact that even under chloroform anaesthesia the body of the uterus could not be felt bimanually in its proper position. The patient was in a state of toxæmia showing an evening rise of temperature to 100°F. Owing to the pressure of the tumour on the urethra and dragging down of the bladder wall she was passing urine only in drops, being an overflow from the bladder which was distended. A catheter was passed and about twenty ounces of clear urine was drawn out. The patient was kept under observation for three days and during this period she was put on an iron and nux vomica mixture. The urine was drawn off thrice a day and the gangrenous protruding mass was irrigated and dressed with mercury lotion, 1 in 2,000. It was considered that to remove the uterus, with the vagina sloughing and foul and occupied by the gangrenous mass, would almost certainly lead to peritonitis by necessarily opening up the peritoneal cavity; but the condition was so distressing that even-

tually it was decided to give her the chance that hysterectomy offered.

Operation.—On the 11th April Lieutenant-Colonel A. Cameron, M.B., O.B.E., I.M.S., Civil Surgeon, Benares, performed complete vaginal hysterectomy under chloroform anaesthesia. He first enucleated the tumour, then amputated the whole mass after securing the round ligaments and the uterine arteries on both sides, care being taken to safeguard the ureters. Above the polypoid mass, consisting for the greater part of the body of the uterus with the fibroid, was a narrower part with a diameter of about 1½ inches, forming a kind of pedicle. In the centre of this stretched pedicle was a canal lined by peritoneum and containing both the round ligaments and the Fallopian tubes. These structures were ligatured with catgut, the canal being closed with one or two catgut sutures. The stump was allowed to fall into position. Great care was taken to exclude the uninfected genital parts and the peritoneum from the operation area; the latter was cleansed thoroughly with saline lotion before being stitched. The vaginal canal was douched with mercury lotion, 1 in 2,000, a roll of iodoform gauze was then packed into the vaginal canal, and the patient returned to bed.

After-treatment and course.—After operation the patient's pulse became imperceptible and her limbs cold and clammy. Four pints of saline were given intravenously and this brought about a rapid improvement. When the patient came round she was put into Fowler's position, and saline and glucose was given per rectum for three days. Twenty-four hours after the operation the vaginal plug was removed and a mercurial douche was given every morning. From the day she was operated upon she began to pass clear urine and no catheterisation was necessary. The patient complained of a slight pain in the pubic region for five or six days and had a slight rise of temperature in the evenings, but this soon subsided, there being no signs of general peritonitis. On the eighth day after operation she started passing loose motions frequently but this yielded to astringent medication. In spite of being kept constantly in Fowler's position she showed signs of congestion of the lungs at the bases, and had a rise of temperature to 102°F. An injection of camphor in oil, and digitalis with expectorant mixture was given orally, all the signs clearing up within a few days.

Henceforth recovery was uneventful and the patient was discharged cured on the 6th May, 1926.

Remarks.—This case is of interest on account of the rarity of recovery of such cases recorded in the text-books.

I am grateful to Lieutenant-Colonel A. Cameron, M.B., O.B.E., I.M.S., Civil Surgeon, Benares, for his kind permission to publish these notes.

Indian Medical Gazette.

SEPTEMBER.

NEW CONCEPTIONS IN MALARIA.

OUR readers may wonder that we should return so often in these columns to the malarial treatment of general paralysis of the insane. The fact is, however, that this line of treatment is not only of interest from the point of view of mental therapy; it is steadily bringing to light principles of fundamental importance in the control and treatment of malaria itself. Hence, from the point of view of the medical practitioner in the tropics, the ever growing bulk of literature on the subject is of the greatest importance. And of extreme importance to all malariologists in the tropics is a paper recently published by Lieutenant-Colonel S. P. James, M.D., I.M.S. (retd.), Medical Adviser on Tropical Diseases to the Ministry of Health, London, under the ægis of the Health Organisation of the League of Nations.* We need hardly remind our readers of Colonel James' great experience of malaria in the tropics, or of how outstanding an authority he is on the problems of malariology. To say that his paper is almost revolutionary, however, is not to do it full justice; it raises new and unexpected problems in connection with malarial transmission and control from many different points of view; it challenges long-standing and orthodox opinion; it may well become classical in its importance in tropical medicine.

Colonel James was working at the Horton Mental Hospital, Epsom, and his duty was the continuous provision of a supply of mosquitoes for inducing a pure infection with benign tertian malaria in the patients to be treated. Two strains of *Plasmodium vivax* were used during the experiments; one obtained from a patient who had contracted malaria in India, the second from a patient who contracted malaria in Madagascar. Both strains were proved on repeated sub-passage to be pure strains of *P. vivax*, not admixed with *P. malariae* or *P. falciparum*; and the transmitting mosquitoes used were all *A. maculipennis*, collected from localities in England where there was no malaria. Thus the first essentials of his experiments were the establishment of a pure line strain of *P. vivax* and the use of only one mosquito species for transmission.

Between December 1923 and December 1925 in all 2,638 female *A. maculipennis* were fed, constituting in all 18 different batches. Of these, 532 mosquitoes ultimately became infected with sporozoites in their salivary glands, and were used to infect 145 patients, of whom 109 took the malarial infection after the mosquitoes were fed on them, and 36 did not—within an observation period of about two months. With the exception of one batch in December 1923—(infection rate 25 per cent.); one batch in June 1925—(infection rate 80 per cent.); and one batch in November–December 1925—(infection rate 20 to 85 per cent.); the surviving mosquitoes in the other 15 batches all reached an infective rate of 100 per cent.; i.e., all that were dissected shewed sporozoites in their salivary glands.

The first point observed in the experiments was the surprisingly high rate of mortality among the mosquitoes used. Taking the successful batches only, of some 1,900 mosquitoes fed on malarial patients, only 532 survived to become infective to man. Yet conditions were ideal for the mosquitoes concerned. When kept at room temperature they were fed daily on human or sometimes rabbit blood. They were carefully housed and faced with no adverse environment. It was found that life in the incubator could be prolonged if the mosquitoes were allowed to feed on glucose, raisins, bananas, etc.; but mosquitoes so fed subsequently became reluctant to suck human blood; also they readily became infected with bacteria and moulds which interfered with the development of the malarial parasites, and sometimes killed the mosquito.

The length of life of the mosquito however could be profoundly influenced by the atmospheric temperature. At 26°C. development of the malarial parasites in the mosquitoes was more rapid than at 22°C., but the mosquito mortality was much higher. Mortality amongst mosquitoes which were not given at least one blood meal every 48 hours was also high. At low temperatures life was greatly prolonged. Whereas at 22°C. some 50 per cent. survived for a week to ten days, if they were transferred to the ice chest at 4° to 6°C. after the blood meal had been digested they would survive up to 2½ months, some individuals indeed for much longer. Hence in general the plan was adopted of (a) feeding the mosquitoes on malarial blood; (b) allowing them to digest the blood meal at 22° to 24°C.; (c) then transferring them to the ice chest, where they were stored until wanted. When required to infect a mental patient the mosquitoes were taken out of the ice chest, carried by cab or train to the place where the patient was—often indeed from London to such distant places as Bath and Devonshire,—fed on the patient, brought back to the laboratory, allowed to digest their blood meal, and then replaced in the ice chest until again wanted.

The conditions in brief in the laboratory were worked out so as to give the mosquitoes the utmost possible chance of survival. Yet four

* Report on the First Results of Laboratory Work on Malaria in England. By S. P. James, M.D., Lieutenant-Colonel, I.M.S., (retd.), assisted by P. G. Shute. Geneva, 1926. League of Nations Health Organisation Malaria Commission Bulletin No. C.H. Malaria 57(1). (Price not stated). British agents for the sale of publications of the League of Nations, Messrs. Constable & Co., 10 and 12, Orange Street, London, W.C.2. (Indian agents for the sale of such publications not mentioned.)

in every five mosquitoes died before their salivary glands could become infected. Under conditions in Nature, where conditions must be even more unfavourable than in the laboratory, the mortality may well be even greater. We thus arrive at the first important conclusion of the paper; that under natural conditions probably very few indeed of the mosquitoes which bite malarial patients survive to become infective to other persons.

The question of whether a mosquito hibernating over the cold weather can carry malarial infection over the winter and become infective in the spring, is one which has been much discussed. Colonel James' experiments appear to provide a conclusive answer in the affirmative. Infective batches of mosquitoes kept over prolonged periods in the ice chest still retained their infectivity. One mosquito was collected (as an adult) on August 5th, 1925. It was finally dissected on November 16th, and shewed active sporozoites in its salivary glands. Between these two dates it had spent about three weeks in an incubator at 23°C. to 24°C. and about two and a half months in an ice chest at from 4°C. to 6°C. The rest of its days were passed in rooms, hospitals, railway trains, cabs, etc., at the ordinary air temperature of the time of the year. It was continuously infective from August 17th till November 16th when it was chloroformed and dissected; it was fed upon 40 mental patients; and on November 9th—more than two and a half months after it first became infective—it successfully infected a patient by a single feed.

Freezing therefore does not eradicate the malarial development in the mosquito. It has been suggested (a) that an infected mosquito would evacuate all its malarial sporozoites at its first feed after it became infective; also (b) by Roubaud that sporozoites which remained for long periods in the salivary glands of the mosquito would degenerate and become non-infective. Colonel James' work controverts both statements. Under "winter" conditions in the laboratory successive crops of malarial oöcysts are ripening at different intervals in the mosquito's mid-gut; successive crops of sporozoites are reaching its salivary glands; and there is a continuous invasion and infection of the salivary glands; the mosquito retaining its infectivity for from 22 to 92 days or even longer from the date of first appearance of sporozoites in its salivary glands. Further, at no time were any degenerated sporozoites observed; they do not appear to degenerate. One must conclude that as far as winter conditions in Europe are concerned *A. maculipennis*, infected with malaria in the late autumn, is capable of carrying over the infection during the winter, and of being infective in the next spring. This finding alone is of great importance, even in the tropics, where such provinces as the Punjab present conditions during the winter similar to those in Europe.

It is surprising how small a proportion of persons suffering from benign tertian malaria are infective to mosquitoes. This question was

thoroughly investigated by Colonel James, and his results are of very great interest. Frequent failures are recorded, even with seamen and others who had returned from the East with chronic malaria, and who relapsed in England. In fact certain patients are "good infectors," whereas others are "poor infectors." And this appears to depend, not on the number of gametocytes present per c.mm. of the patient's blood, but on some individual idiosyncrasy on the part of the patient. The gametocytes in some patients are highly infective to mosquitoes; in other patients they fail to infect the mosquito. It is not so much the number of gametocytes present which affects the issue, as some quality of "ripeness" or suitability of the gametocytes.

In primary infections—i.e., first attacks of malaria in mental patients who have not previously suffered from malaria—gametocytes were never found in blood films before the seventh day after the first rise of temperature, and they were never infective to mosquitoes until three days later. In relapses however they occurred earlier. They also occurred earlier in patients infected by direct inoculation of malarial blood than in persons infected through the agency of mosquito bites. Successful feeds were obtained when the number of gametocytes varied from a proportion of 7 to 700 leucocytes to a proportion of 10 per 120 leucocytes. In general, in primary malaria the number of gametocytes was found to rise rapidly at the beginning of the second week of the attack and sometimes to fall during the third week. Female gametocytes on the whole considerably outnumbered males.

We see, therefore, from this section of the work, how enormously important are the biological factors influencing the question of whether a mosquito which feeds upon a malarial subject will "take" or not. If only one in five mosquitoes fed will become infective under ideal laboratory conditions, the problem is yet further complicated by the fact that only a small proportion of human malarial patients are "good infectors."

The number of feeds which the mosquito takes on a malarial subject is one of the most important factors in its infection. This was demonstrated as long ago as 1901 by Daniels. In this connection, as Colonel James points out, it is surprising how few observers note that, in order that the feed should be successful, the mosquitoes must shew not only oöcysts in their stomachs, but also sporozoites in their salivary glands; too many workers are content to write down a mosquito as a carrier on the observation alone of oöcysts in the mid-gut; it is the salivary gland findings that are the crucial test as to whether a given prevalent species is or is not a carrier. In his experiments the mosquitoes were fed daily for seven days, and it was found that the number of feeds was very important. Thus in one instance mosquitoes were fed upon a patient with daily counts of 7; 25; 710; 200 and 259 gametocytes per 500 leucocytes in his

blood. Dissections shewed that at the first two daily feeds only 40 per cent. of mosquitoes became infected; by the fifth daily feed the percentage had risen to 70 per cent. infected; ultimately 85 per cent. of mosquitoes fed—for five days only—shewed sporozoites in their salivary glands. In some batches zygotes and early oöcysts appeared, but failed to develop further, a fact which may be of much importance in connection with malarial transmission generally. The earliest period at which sporozoites were found in the salivary glands with mosquitoes kept at 24°C., was the tenth day; a temperature between 22°C. and 24°C. with saturation humidity was the one at which most rapid development of the malarial parasites occurred; above 23°C. or 24°C. attempts to hurry up the cycle by incubating the mosquito at higher temperatures were often found to be fatal to the insect; whilst changes of temperatures should be gradual rather than sudden. Changes of season did not appear to affect the cycle (in the laboratory).

Egg-laying, however, proved a new and unexpected factor affecting the development of the malarial parasites. In May and June when oviposition is in progress, the swollen ovaries fill the abdomen and press against the mid-gut of the mosquito to such a degree that its cavity is almost obliterated. Females in this condition do not refuse to suck blood, but the blood, instead of passing into the mid-gut, fills and distends the oesophageal diverticula. On dissection the mid-gut is found quite empty of blood, and a female *Anopheles* fed when in such a condition, could not become infected. On the other hand, immediately oviposition has occurred—(if the mosquito has survived the process)—the mosquito is so hungry that it will attack the nearest man and take a full meal of blood, even during the daytime. If a previously infected mosquito takes its egg-laying flight, oviposits and survives the process, its next act will be to bite and suck blood from anyone who happens to be near it. It is this factor, probably, which explains infection of man after only a single exposure to infective conditions on the banks of a marsh or pool.

The above furnishes, perhaps, a summary of the first section of Colonel James' work, and is chiefly concerned with the factors affecting the success or otherwise of transmission. But the second section of the work, which is of not less importance, deals with the clinical conditions present in the recipients of the infection. And, in the first place, Colonel James emphasises the great necessity to take into consideration all the factors present before one concludes that a given individual is "resistant" to infection; errors of technique alone will explain many such failures.

Of the 145 mental patients upon whom infective mosquitoes were allowed to feed, 36 failed to become infected. These failures occurred during the winter months between November and March, and 26 of them occurred with batch No. 18 of mosquitoes, which failed to reach the

100 per cent. degree of infection. Before concluding that these patients were really "resistant," the author says that he prefers to wait until the spring, in case they are really infected but will not develop malaria until after a long latent incubation. On the contrary several instances are given where patients reported to be "resistant" to previous experimental feeds in the hands of other workers, were successfully inoculated by Colonel James' mosquitoes. One such patient developed malaria after he was supposed to be "immune," his blood was used for direct malarial transmission to other recipients, and successfully provoked malaria in three other supposedly "immune" persons: "Immunity" and "resistance," in other words, are often synonymous with faulty experimental conditions. Further, patients who had had one or more attacks of malaria from direct blood inoculation, were shewn to be still susceptible to infection from infected mosquitoes. It had been previously noted by Christophers and by the Sergeant brothers that a sparrow suffering from a proteosoma infection due to the bite of a *Culex* mosquito A, could be successfully superinfected with proteosoma infection by the bite of an infected *Culex* mosquito B. In man the same state of affairs appears to hold good; a patient suffering from malaria due to the bite of mosquito No. 1 is still susceptible to become superinfected by the bite of infected mosquito No. 2. "One attack of malaria (induced either by blood inoculation or by mosquito bites) due to a strain of *P. vivax* does not confer an immunity against a second infection with the same strain." This single finding may be of great importance in the study of malariology in the tropics. What a patient appears to acquire after prolonged residence in an endemic area is tolerance to the malarial parasite, rather than any real "immunity"—or power to destroy parasites by parasitocidal substances in the blood, etc.. In the meantime he is susceptible to repeated infections; the mere fact that he is suffering from malarial infection No. 1 does not render him immune to superinfection with malarial infection No. 2. In other words, he may reach a degree of infectivity towards the mosquitoes of the locality of a very high order; he may become a "good infector" of a high grade. "Immune bodies" in the blood of infected and convalescent malarial patients have often been quoted as explaining why the natural tendency of even untreated cases of malaria is towards spontaneous recovery. There is little evidence of the presence of such "immune bodies." There are undoubtedly certain individuals who fail to "take" in any marked degree; some of the mental patients on whom Colonel James experimented failed to shew anything more than a slight rise of temperature, not associated with any clinical symptoms. Everyone who has worked in the tropics must have encountered such cases; patients for example whose blood films shew numerous malarial parasites, but whose clinical symptoms are confined to at

most a little erratic low-grade fever, or some malaise. "Immune substances" in their blood is an easy explanation of such a condition; but it only amounts to a confession of ignorance, and is equivalent to a statement that we do not know in what factor the "immunity" lies. There are certain persons whose blood is "inhospitable" to the malarial parasite; and a study of the biochemical conditions present in the blood of such persons is urgently needed.

Benign tertian malaria is usually regarded as one of the most clear cut fevers of the tropics. We are accustomed to regard it as a fever with a striking and mathematically regular periodicity. Every 48 hours with almost mathematical certitude the temperature chart rises to an abrupt peak, the patient has a rigor, followed by sweating and an almost abrupt fall of the temperature to normal or sub-normal. Periodicity of the fever is regarded in the text-books as one of the most characteristic signs of benign tertian malaria.

Yet against this are the laboratory findings which are usually found in benign tertian malaria. It is true that if one takes a blood film from a patient suffering from his first rigor in an attack of benign tertian malaria, all the parasites discovered may be at the same stage of development; they may be all early trophozoite "rings," or fully mature schizonts. On the other hand what is very characteristic of blood films from cases of benign tertian malaria is that the same film may shew parasites at every different phase of development. On the one hand we have a patient shewing a temperature chart of mathematical regularity, with a rigor every 48 hours; on the other hand blood films from this patient will shew parasites at every stage of development; young trophozoite "rings," early schizonts, mature schizonts, bursting "rosettes" and gametocytes all present simultaneously in the same film. This paradoxical finding has long puzzled malarialogists. Colonel James' paper provides its solution.

In the tropics it is probably true to say that 90 per cent. of cases of benign tertian malaria which come under observation are infections of old standing; the patient is probably in his fourth, fifth—or it may be his twentieth—relapse. As has been clearly shewn by Acton in his work at Dagshai, the benign tertian parasite is the one especially associated with chronic and relapsing malaria. Conditions with Colonel James' patients, however, were entirely different. His patients were mental cases in residence in England, experimentally infected under fully controlled experimental conditions. He was, therefore, able to study the differences between (a) "primary malaria," i.e., the benign tertian malaria following as a first attack after infection from the mosquito—the patient never previously having had malaria in his life before; and (b) relapses in such persons, after a first quinine treatment, or after spontaneous recovery from the first attack. And he finds that the text-book

description of benign tertian malaria is inaccurate. Primary attacks shew an entirely different temperature chart from that shewn by relapsing and old-standing cases.

In the primary attack the period of incubation after the mosquito bite is from 7 to 23 days. The patient now develops what he terms the "initial stage" of the attack, which lasts from 2 to 5 days. This begins as a "relapsing" irregular fever; at first irregularly remittent, but towards the end of this stage always intermittent. There are no rigors during this stage, and its termination is sometimes shewn by an intermission lasting 24 or 48 hours.

The initial stage is followed by the developed stage. In 80 to 90 per cent. of cases, this is not a fever with tertian periodicity, but a *quotidian* fever. There is a rigor every day; and this is true, whether the patient has become infected by the bite of only one mosquito upon a single occasion, or by the bites of many mosquitoes on several dates during the incubation period. The developed stage lasts for ten days, or often for longer.

The type of fever now changes to the terminal stage; and the temperature chart changes from a *quotidian* to a tertian fever with a rigor every 48 hours. By degrees the patient recovers from the attack, the symptoms diminish in severity, and spontaneous (clinical) cure sets in.

Such is the course of primary benign tertian malaria in the untreated subject; and it is not described in any text-book. In only some 10 per cent. of patients is there a deviation, and if a primary attack runs a clear tertian course from its commencement, it is worth while enquiring into the previous malarial history of the patient.

What accounts for this changing febrile picture; at first an irregular fever, then a *quotidian* fever, lastly a tertian fever? There is no reason to believe that it is due to any change in the life cycle of the parasite; in culture, as in the human body, *P. vivax* completes its schizogony cycle with great regularity in 48 hours; it never speeds up to 24 hours. But if films taken at four-hourly intervals be studied, we find that some parasites lag in their development. The blood picture—at first one in which every parasite was at the same stage of development—becomes confused, with parasites present at all stages of schizogony. This finding is always present during the first initial stage, with irregular fever.

As the fever progresses, two dominant strains of parasite become evident, completing their schizogony cycle on alternate days. This is associated with *quotidian* fever and rigors.

Lastly, as the terminal stage is reached, the patient's powers of resistance overcome these two parasitic broods. The brood which is least numerous or less resistant will be overcome first; so that the fever will change to a tertian type, due to the surviving brood. Finally even this brood is exterminated, or held in check, and fever gradually disappears altogether.

We have here a clinical picture of benign tertian malaria which has never before been presented, (as far as we know). It is exceedingly informative, and—it may be remarked in passing—it provides a strong argument against the existence of a "quotidian" species of malarial parasite, causing rigors every 24 hours.

In the fever of relapse—or in benign tertian malaria induced in a patient for a second or subsequent time by the bites of mosquitoes—matters are entirely different. The first, primary attack of malaria appears to have salted the patient, as it were; and we now have the typical classical benign tertian malaria of the text-books. There is little or no initial stage, and no stage of quotidian fever precedes the onset of typical tertian fever with a rigor every 48 hours. Curiously enough, however, the blood picture still remains confused; we may still find parasites at all phases of schizogony in blood films from such patients. The temperature chart however reflects the schizogony cycle of the parasite strain which is most dominant, and the patient's powers of resistance are apparently able to suppress effects due to other strains.

The relationship between the dose of sporozoites injected, the incubation period of the disease, and the severity of the symptoms shewn is a matter which has often been discussed. Here Colonel James states that he can come to no definite conclusion. His patients consisted of four groups; (a) those infected by the bite of a single mosquito on a single occasion; (b) those infected by the bites of several (three to ten) mosquitoes on a single occasion; (c) those infected by the bites of many mosquitoes (up to 120) on a single occasion; and (d) those infected by the bites of several or many mosquitoes on different dates during the incubation period of the disease. The data which resulted do not shew any clear cut difference between the groups, but the subject requires further study. Individual "susceptibility" and the accuracy of experimental technique play a part, the degree of which has still to be determined. The shortest incubation period was 7 days, the longest 23 days, and the average 10 to 12 days; but, unless the temperature is recorded every four hours, the initial febrile manifestations of the attack are liable to be missed.

We trust that we have given an adequate summary of this exceedingly important paper. It is one which should be studied in the original by every malariologist in India. Even more important than the experimental facts recorded, however, are their possible bearing upon the problems of malaria.

In the first place we have an entirely new clinical picture of benign tertian malaria presented to us. The primary fever of the first attack differs entirely from the fever of relapse or of re-infection. It has hitherto been impossible in India to differentiate primary benign tertian malaria from relapsing benign tertian malaria. In institutions under full medical control,

such as in the Army in India, and in prisons, etc., it should now be possible—at least roughly—to sort out primary benign tertian infections from those due to relapse or re-infection; and to study different methods of treatment in the two different categories of cases. A four-hourly temperature chart is obviously essential. And it may well prove to be the case that, when so studied, primary infections will be found to be very amenable to treatment, whilst in the case of relapses successful treatment will be found to be a much more difficult problem, and its solution may not be along the line of attempting to exterminate the parasites by new chemical remedies—often at the expense of the patient; but of trying to so stimulate the patient's natural powers of resistance that he will be able to overcome the infection for himself.

The implications with regard to malarial control are of even greater importance. Not so many years ago "anti-malarial measures" in a cantonment or a municipality in India consisted in collecting together a "mosquito brigade" under the charge of a person more or less ignorant of the subject, providing them with sprinklers and kerosine, instructing them to spray any and every collection of water on any date, and trusting to Heaven that this blind attack in force upon an entrenched enemy would bring victory. To-day we are wiser; we have learnt the importance of reconnoitring and of generalship. We realise that malarial survey must precede malarial control. We must first discover what local species of anopheles are carrying the disease; in what sites and at what seasons of the year they are breeding; where are the human gametocyte carriers who constitute the human reservoir of infection; where are the susceptible population who are liable to become infected. We realise that the same amount of money spent under intelligent direction and applied at the right time and in the right place will achieve far more than random measures taken in the dark. The change in policy in military cantonments, in tea-gardens and other industrial concerns, even in Indian municipalities within the past fifteen years has been enormous; and it is entirely a change of policy in the right direction.

But, if Colonel James is right—and his conclusions appear to be very well founded—we must concentrate our efforts still further. Very few of the potential anopheline carriers which bite man will become successfully infected; whilst only a small proportion of human gametocyte carriers are "good infectors" of mosquitoes. By degrees we gain a conception of malaria—in its endemic form)—as almost a household disease. Given a small household or *busti* with infected children who are "good infectors"; given the right species of anopheles for carrying the infection; give the latter unlimited opportunities for repeated feeds upon the infected blood of "good infectors"; and we see that we may have very limited foci—household sites almost—of intense infectivity, where what

are practically laboratory conditions prevail, and where the mosquito infectivity rate will reach 100 per cent. "Our observations help to explain why it is the general rule to find only a low percentage of infected anopheles in Nature and why malaria in Nature is seldom or never contracted except in certain houses or shelters where the above circumstances and conditions pertain," writes Colonel James. "They fortify the opinion that malaria is essentially a household disease and particularly a disease of certain kinds of houses that fulfil the 'laboratory conditions' which we have described. The reasonable inference is that malaria should be dealt with in the houses of the people rather than in the environment." It is a quotation which may well give malariologists in India furiously to think.

From its text we gather that Colonel James' report is in the nature of a preliminary report only. Its importance to workers in India is very great. We trust that we may look forward to its amplification and expansion with full details, protocols, and above all temperature charts, in a later publication. It deals, of course, with *P. vivax* only, with only one species of mosquito, and with what approximate only to endemic conditions. It is possible—indeed likely—that epidemic conditions, and conditions in *P. falciparum* infections are very different. It would be of great interest to compare Colonel James' report with an investigation conducted on similar lines in connection with epidemic and malignant tertian malaria.

His final conclusion with regard to endemic malaria as a household disease appears to us of great importance. Kala-azar is also a household disease, and the evidence that *Phlebotomus argentipes* is its insect vector is now overwhelming, though the final transmission experiment has still to be carried out. Plague is transmitted by rat fleas of certain species. Household flies may play a very important part in the spreading of intestinal diseases in India.

To eradicate these insects in their breeding grounds is often difficult, often costly, sometimes nearly impossible. Yet insecticides are at present regarded chiefly as secondary lines of defence. Has the time not arrived when the medical research workers of India should turn their attention more closely to the problem of providing very cheap yet very efficient insecticides? An industrial concern cannot afford more than a certain very small revenue expenditure per head of its employees in anti-epidemic measures. Given the money, public health workers can eradicate epidemic disease; the Americans stamped out malaria in the Panama Canal Zone and have almost eradicated yellow fever in Southern America. Yet such schemes are too expensive for India, though where they have introduced on a smaller scale, they have paid well in improved health and efficiency of the labour force concerned. But the coolie's hut and the villager's *busti* remain throughout the land. Is there no cheap and efficient method of ridding them of

their insect pests by a weekly application of some insecticide? That ideal, efficient and cheap insecticide has, however, still to be discovered.

R. K.

Postscript.—Since the above editorial was written, there has come to hand a brief review of the same article by Mr. Senior-White, Malariologist to the Bengal-Nagpur Railway. Mr. Senior-White's own work on malarial prevention is well known in India. He deals with Colonel James' paper from the view of the entomologist, and his review of the paper is published below, as—being written from the standpoint of the entomologist—it supplements what has been written above.

SOME IDEAS ENGENDERED BY RECENT WORK ON MALARIA.

By RONALD SENIOR-WHITE,

Malariologist, Bengal-Nagpur Railway.

THE malarial treatment of general paralysis of the insane has thrown a light into many obscure corners of the malaria problem, but no paper that the writer has read recently has given him so much food for thought as the report by James and Shute on the "First Results of Laboratory Work on Malaria in England," published by the Malaria Commission of the League of Nations. Studied in conjunction with the present writer's paper, "Physical Factors in Mosquito Ecology," no one can fail to be struck most forcibly with the clumsy costliness of the means by which present-day malaria control is effected.

In his paper above referred to, the present writer has tried to show how delicate is the balance of the factors, the results of the interplay of which permits a species to breed successfully. Since many of the actual factors are still to seek, their various energy-levels which result in a particular body of water becoming the breeding place of a particular species cannot yet be determined, but a start has been made, the goal of which is to prevent, cheaply and efficiently, the "breeding balance" being attained for the breeding-place under attack. And now Colonel James, using wild mosquitoes caught adult in their haunts, has attacked another side of the problem, taking it up from the point where the actual mosquitoes have been produced.

At one particularly deadly spot in the hills of the Agency Tracts of the Madras Presidency the writer found a zygote rate of 12.5 per cent. in a lot of *A. funestus* captured in a camp, but it is common knowledge that even in a highly malarious locality a zygote or sporozoite rate of 1 per cent. is the most one can usually expect. Now James and Shute have successfully induced 100 per cent. rates for both stages of the parasite. If this occurred with any frequency in Nature, there are many localities where Man would cease to represent an element of the local

fauna! It is permissible, I think, to doubt if such infection rates ever occur naturally, even at the height of a fulminant epidemic. What then happens? James and Shute show that, if laboratory results are strictly comparable with what happens in Nature, when a temperature of 24°C., (75°F.), is attained for ten days continuously, only one infected specimen in five will survive to become infective. Naturally, values obtained for the palearctic *A. maculipennis* will not be identical with those applicable to tropical species, in all probability every species of the world-fauna has different toleration limits in this and all other respects, features which constitute as much a part of its specific entity as its wing markings or its male genital appendages, but the determination of a figure in one case will stimulate the search for its evaluation in others.

However, in reference to James' and Shute's temperature toleration figure for *maculipennis*, it cannot be allowed that the laboratory results are strictly applicable to events in Nature, where temperature and humidity are never constant, whilst their own results show that a decrease of 2°C. makes a considerable difference in promoting longevity. But, whether strictly applicable or not, the obtaining of a result should promote further research on the effect of variations of natural amplitude.

From this point James and Shute pass to the consideration of persons who are good and bad "infectors" of anophelines, and a protozoological point of the highest importance is raised by their reference to the quality of "ripeness" in gametocytes. What this quality may really be is a point they did not attempt to follow up, but it should stimulate some worker to discover the factors involved. As they show, the oft-quoted figure of twelve gametocytes per c.mm. of blood may often fail to induce infection in the mosquito,—values up to thirty-two times that amount have failed in their hands to cause more than 40 per cent. of a batch to acquire the parasite. This discovery renders nugatory much, if not all, of the work done in the past on the carrying capacity of the various species, results on which is based fundamentally the modern anti-malaria method of "species control," and would serve to explain various anomalous findings, such as *A. barbitrostris* as a carrier in a small "house epidemic" in the F. M. S., described to the writer by Hacker, but, I think, never published, and would perhaps constitute a point towards the acceptance of Lator's hypothesis that at the height of an epidemic normally refractory species are carrying. (Lator. "A teleological working-theory of the symbiosis of the malaria parasite in man and the anopheles mosquito.")

The authors then discuss the influence of temperature, humidity and season on the infectivity of anopheles. Were these understood, how much effort and money, now probably expended uselessly, would be saved. Now-a-days, we treat water right through the year, so long as breeding is going on therein, on the supposition that the

emergence of adult specimens is tantamount to the continuance of infection, for Jonesco's discovery of the upper and lower limits of temperature for sporogony (in the B. T. parasite only, be it remembered) does not help us enough owing to the fact that the mosquitoes may be spending the major part of their existence within houses to which the readings of the local meteorological station—and it is seldom enough in actual field work that one is available—do not apply. Now the acquiring of the parasite is not an essential in the life-history of any species of anopheline, and very possibly the majority of the potential adults we kill throughout the year would never become infective at all, were they permitted to breed up and emerge, but, we do not know this, and so we kill them off, securing our results, and congratulating ourselves, whereas we should have attained the same, possibly, by effort over a few months only, leaving us with money now uselessly expended to spread over a wider area.

James' and Shute's finding of the diversion during ovulation of the blood-meal from the stomach to the cesophageal diverticula, with consequent non-infection of the insect, is of great interest, but probably of much greater importance in regions with strongly contrasted seasons than in the tropics, where generations succeed one another over the major portion of the year. None the less its applicability is wide for malaria is not a purely tropical disease. That pregnant females, who take a much smaller blood-meal than those with normal ovaries, must stand a smaller chance of infection is a proof of James' contention in this paper that tropical species such as *culicifacies* and *indlowi* acquire infection more easily than *maculipennis*. Comparison of events between temperate and tropical species in this respect seems urgently called for.

On page 22 the authors call on the biochemist for an explanation of the causes of "susceptibility" and "resistance" to malarial infection. If such causes as they suggest, slight differences in blood pH and protein content, are found explanatory, more tests will have been added to the medical examination of candidates for tropical posts, and much suffering and financial waste eliminated.

After showing that in the induced disease, at least in respect of *P. vivax* infections, the classical picture is not applicable, the authors go on to discuss the meaning of their results, and it is this section of the paper, above all, which gives one "furiously to think." For they state, ".... He will appreciate how the secret of successful control of malaria lies not in the general knowledge that the disease is spread by mosquitoes of a certain kind, but in the particular exact knowledge of the life history of the few individual mosquitoes which succeed in becoming transmitters of the disease." This is a hard saying, but a stimulating one. It will, according to the authors, not be enough merely to discover definitely for each place the season of transmission, and during that only to attack the incriminated

species of that locality, but it will be necessary to discover the factors which lead to certain specimens of those species, and, I would add, of perhaps others normally accounted harmless, taking up positions where they become effective transmitters. Annihilate such specimens only, and malaria control is accomplished. But as yet it is a far cry to the time when malaria can be "dealt with in the houses of the people rather than in the environment." But, could this be accomplished, what a vista is opened up! Protozoologist, Biochemist and Entomologist,—this paper should stimulate all of us into "getting down to it"!

Current Topics.

The Study of Malaria in General Paralytics Artificially Inoculated with a View to Treatment.

WHATEVER may be the percentage of successes in the induced malarial treatment of general paralysis of the insane, there can be no doubt of the tremendous flood of light which this treatment is throwing upon the study of malaria itself. Not only is the treatment itself very often successful; its value in clearing up many of the outstanding problems in malaria is very great. In the *Journal of Tropical Medicine and Hygiene* for April 15th, 1926, Dr. A. R. Grant, M.D., and Dr. J. D. Silverton, M.B., B.S., of the County Mental Hospital, Whittingham, Preston, Lancashire, record their findings in connection with this treatment. Certain features of the malarial aspect of this treatment are now becoming well recognised; for instance the extraordinary susceptibility of the malaria—so induced—to a short course of quinine treatment, as compared with the relative resistance of old-standing malaria naturally acquired in the tropics; the fact that mosquito-borne malaria is a more severe infection and much more difficult to treat than is malaria induced by primary inoculation of infected blood. It would appear that in malaria—as also probably in sleeping sickness and in kala azar—transmission through the insect vector of the disease raises the virulence of the infective virus to man. Finally, the curious small percentage of cases of spontaneous cure of the induced malaria with no quinine treatment at all.

It is likely that a continuance of such studies will throw much light upon malarial problems which are as yet not solved in tropical practice. We take the following notes from the paper by Drs. Grant and Silverton:—

"The treatment of general paralysis of the insane by malaria has been carried out in this hospital since July 21, 1922, and several observations on the value of this form of therapy in the disease have been made from time to time. In this short note we wish to draw attention to some of the characteristics and behaviour of a strain of malaria which has now reached the fourth year of its existence and which still retains all its former potency and therapeutic value.

"After preliminary work with strains of quartan, malignant tertian and simple tertian fevers we came to the conclusion that the latter was the most useful for our purpose, and so the birth of the Whittingham (W) strain took place on September 8, 1922, when a general paralytic was inoculated with blood from a patient who had contracted benign tertian malaria in India. From this host a long chain of cases of general paralysis and tabes has been infected, with the result that during the last forty-two months (three and a half years) the strain has been transmitted by direct subcutaneous inoculation through sixty generations, comprising over one hundred

and fifty cases. Anopheline mosquitoes (*maculipennis* and *bifurcatus*) were infected with *Plasmodium vivax* by feeding them on patients in the twelfth and sixteenth passages of the strain. These mosquitoes were subsequently used to infect two of our cases, namely, one case of tabes dorsalis and one case of dementia præcox. Two more malarial stems of the simple tertian type were thus obtained, and as one originated in a non-syphilitic case of dementia præcox, we decided to name our strains of tertian malaria Whittingham (or W), W I and W II respectively. The strains W I and W II were allowed to die out; the former in a syphilitic host, was not further utilized, and the latter was stopped after several successful passages in non-syphilitic psychoses led us to believe that malaria was not a therapeutic measure of value in these cases. Again, with the introduction of the Pötzl method of inoculation, which in our hands has been successful with infected blood kept outside the body at 0° C. for varying periods up to seventy-two hours, we have enabled other hospitals in the country to commence and make observations on this form of treatment. The W strain in this way has been of service in several general and mental hospitals.

"Artificially induced malaria was obtained by injecting usually 2 c.c. of recently drawn venous blood from an infected source into the subcutaneous tissues of the host. As a general rule this operation was not followed by any constitutional or local reaction, but in a few cases fever (a temperature up to 101° F. on the second or third day), frontal headache and soreness at the seat of inoculation were encountered.

"The incubation period, calculated from the date of inoculation to the day of appearance of parasites in the peripheral blood-stream, has been fairly constant, and although varying occasionally between six and twenty days, averaged from ten to twelve days throughout the period. In five cases, two inoculations were required before the fever and parasites appeared. These failures after primary inoculation were evenly spread over the "life" of the strain under review, and cannot be satisfactorily explained. Seizures of an epileptiform or apoplectiform nature have occurred during the incubation period, and on each of the three occasions we have considered it wise to prevent infection taking place and to reinoculate at a later date.

"Ronald Ross mentions that Ben-Harel has shown that in a series of blood inoculations of canaries with proteosoma, the red blood-cell count begins to diminish even as early as the day after the inoculation and long before the parasites become sufficiently numerous in the bird's peripheral blood to be detected. The decline was progressive day after day, until from one half to two millions of erythrocytes disappeared from the normal count (4.5 to 5 millions per c.mm.), when the parasites were discovered in the peripheral circulation. Daily erythrocyte counts were made on a series of seven male general paralytics before and after the inoculation and every day until *P. vivax* was demonstrated in the blood-films. The drop of blood in each case was taken from the finger two or three hours after the midday meal, and an average of three counts recorded. On the first day after inoculation there was a reduction in four cases, and an increase in the remainder; on the second day a reduction took place in five cases; on the third day in four counts, and on the fourth day a drop in five instances. In Case 4 there was an erythrocytosis for four days. On the sixth day and up to the day of appearance of parasites, the erythrocytes showed a diminution in all the cases. The lowest counts were recorded usually between the fifth and eighth days inclusive and averaged 3,100,000 cells; the reduction, however, was never progressive.

"The commencement of the fever generally preceded the appearance of parasites in the peripheral circulation by one to four days; often parasites and fever coincided in the day of their appearance, while occasionally *P. vivax* forestalled every sign of approaching fever by two to four days. The fever began usually with an increased pulse-rate and an elevation of temperature to 99°–100° F., which mounted gradually for the next

two or three days to a maximum of 103° or 105° F. before subsiding to the normal. This form of irregular pyrexia generally preceded and formed an introduction to the development of the malarial rigors that invariably followed in their regular sequence. Rigors, although often slight in degree, appeared in some cases without any preliminary warning and waxed in intensity as the fever continued.

"In the early and middle passages of the strain the types of fever in order of frequency were quotidian, a mixed type of tertian and quotidian, and pure tertian. The quotidian fever or tertiana duplex has appeared most frequently during the whole period, but less so at the present moment, as the pure tertian type is becoming more common. As many as three paroxysms of fever have taken place in the short space of twenty-four hours, but fortunately for the patient this occurrence is uncommon.

"In order to study more closely the changes in temperature during the various stages of the paroxysm, a series of patients were put on to a 'continuous' chart, i.e., from the date of inoculation to the day of the disappearance of parasites, the temperature, pulse and respiration rate were taken at intervals of half an hour and recorded. In this way several interesting observations were made. For instance, we found that quite often the temperature showed an elevation of 2° to 3° F. above the subnormal interval range for an hour or two before rigor actually took place, and less frequently, a rise of temperature ranging between 99° and 104° F. for a period of four to six hours suggested the same approaching phenomenon. In many cases the rigors were atypical and the rise of temperature or the stage of sweating were the only criteria that a paroxysm of malaria had taken place. On the whole, the stages were clearly cut and observed a certain proportion to each other; as a rule, the more pronounced the rigor, the higher the fever and the more profuse the sweating. The maximum temperature of the paroxysm was reached in one-half to three hours and varied in height with the number of the rigor; generally, the highest maximum was seen in the third, fourth or fifth, and ninth and tenth rigors, but this variation did not always hold good. The highest maximum temperatures recorded in the cases of the early stages of the strain ranged between 103.6° and 106.2° F. and at the present stage vary between 105° and 107.2° F. During the sweating stage the temperature gradually came down to normal, taking longer (from nine to seventeen hours) in the early than in the later rigors (from five to eight hours).

Stephens *et alia* in 1921 studied the times of onset of one thousand paroxysms of simple tertian fever in mosquito-borne malaria, and came to the following conclusions:—

(a) Over 90 per cent. of the paroxysms occurred during the hours of activity (7 a.m. to 7 p.m.).

(b) The maximum number of paroxysms occurred at 2 p.m.

(c) Alteration of the period of activity by one hour, the result of the adoption of summer time, produced a corresponding alteration in the time of incidence of the paroxysms.

"Now in our cases the conditions were markedly different, as, firstly, the inoculations were carried out in almost all the cases during the day, and, secondly, the patients were restless and mentally active by night as well as by day. An analysis of 500 paroxysms was made and the following data are available for contrast:—

"In the winter months 85.2 per cent. of the inoculations were carried out between 11 a.m. and 3 p.m., and 81.4 per cent. of the paroxysms occurred between 7 a.m. and 7 p.m.; the maximum number of paroxysms occurred at 2 p.m.

"In the months when the summer time was in force, 86.9 per cent. of the inoculations were performed between 11 a.m. and 3 p.m. and 74.7 per cent. of the paroxysms occurred between 7 a.m. and 7 p.m.; the maximum number of paroxysms occurred at 2 p.m. and

"A few inoculations were performed at midnight in the anticipation that by this measure most of the paroxysms would occur during the night or early morning. The alteration in the time of injection did not alter the times of onset of the rigors and so the practice was discontinued. The onset of the chills may show a definite time relationship to each other during the course of the fever. Very frequently one may see from the examination of charts from cases of tertiana simplex that the individual rigors tend to anticipate in time of appearance the previous rigor and so on, throughout the course, whereas in quotidian fever both anticipation and delay in the times of appearance may be encountered.

"The question of the number of paroxysms that should be permitted in individual cases has always been of engrossing interest to us and of paramount importance to the patient. Our early cases were permitted to have as many as five to twenty-four paroxysms (chiefly from ten to twelve), but we soon came to the conclusions that a patient who was going to get better would do so after treatment with five rigors as with fifteen, and at the same time would be spared an unduly prolonged fever with its train of complications and sequelæ. Again from a histo-pathological study of the brains of successfully treated cases of general paralysis of the insane, Straussler and Koskinas have found that at least five malarial crises are required before changes are initiated in the cerebral cortex to bring about a condition simulating the 'stationary paralysis' of Alzheimer. Further, the reduction in the average number (from seven to eight) of rigors permitted has not been followed by a corresponding drop in the rates of recovery or improvement, so that our practice of allowing no fewer than five, but not more than ten, paroxysms of malaria has been apparently justified.

"General paralytics and patients suffering from tabes dorsalis generally tolerate this form of fever extraordinarily well. In a small percentage of cases, prodromal phenomena in the nature of various sensory disturbances may make their appearance and herald the approach of a paroxysm. These subjective sensations occurred in tabetic and non-tabetic patients, and varied from a dull ache in the leg bones, especially the tibiae, to severe and lancinating pains in the joints or cramp-like pains in the calf muscles. Very often pains continued during the cold and hot stages of the paroxysm and disappeared as soon as perspiration commenced. The physical signs that accompanied the recurring paroxysms of the fever were apparently similar to those observed in mosquito malaria, but mental reactions were naturally expected to occur more frequently in our patients and often did so in the later rigors. Delirious states, hallucinations of sight and of hearing, paranoid ideas and severe emotional outbursts with intense restlessness were encountered and, as often as not exhibited a tendency to become more prominent in the hot and sweating stages of two or three paroxysms and then disappear. Several reactions in the nature of paralytic seizures complicated the picture in four cases. Herpes was quite common and appeared usually about the lips, less frequently about the nose, angle of the jaw, or malar bone. Attacks of gastro-enteritis with vomiting and diarrhoea were occasionally present, but they were never severe in type and always responded quickly to treatment. Sub-icteric staining of the skin and mucous membranes occurred in the final paroxysms of a few cases. Clinical jaundice with bile in the urine occurred in four cases at the thirteenth, thirty-first, thirty-second, and thirty-ninth passages of the strain. The condition, which is always of serious significance and of grave prognostic import, appeared following the fifth, but nearly always after the seventh paroxysm. As a severe infection of the blood-stream with rapid and abundant hæmolytic of the red cells was suspected, the treatment was immediately brought to a close by the institution of quinine therapy. In three of the four cases the bile in the urine disappeared after three doses of quinine had been given, and at the end of a week no trace of bile staining of the tissues could be seen. The fourth

case, which was also the thirteenth host, did not do so well and passed on to a fatal issue on the day after the jaundice appeared. In one instance, where the treatment was prematurely arrested because of this complication, a reinoculation was successfully performed at a later period, when the patient passed through a complete course of fever therapy without showing any signs of jaundice. Daily examinations of the urine revealed generally a darkly-coloured urine, acid in reaction and of increased specific gravity. Albuminuria was common, but usually no more than a trace was the rule; a marked increase occurred in two cases associated with pronounced constitutional reactions and indicated immediate stoppage of the treatment. Glycosuria (1 to 1.5 per cent.) was rare. The Russo reaction may be positive prior to the appearance of bile and was associated with sub-icteric staining of the tissues. Urobilinogen was slightly but infrequently increased. Hæmoglobinuria fortunately did not occur. Enlargement of the spleen, as far as could be ascertained by palpation and percussion, was always slight even during the paroxysm; this was also confirmed in cases which came to necropsy. At the end of the fever there was usually a loss in weight, varying in individual cases from one to eight pounds, with an average of four pounds. Occasionally a gain in weight actually took place. Pallor of the skin and a mild degree of secondary anæmia were observed in most of the cases during the final paroxysms or at the end of the fever. As a general rule, the condition cleared up very quickly with the administration of quinine, and at the end of a week the blood-picture became normal. Deaths within a month of completion of the fever course occurred in eleven cases and formed 55 per cent. of the total number of deaths in adequately treated cases over a period of three and a half years."

"The morphology of the parasite (*P. vivax*) was carefully studied in over ten thousand blood-films that were taken in all cases at every stage over a period of three and a half years; and we found that the parasite retained the form and characteristics of that seen in naturally infected cases and, despite the number of transmissions through the vertebrate host, crescents were never found. Schüffner's dots in infected red cells were common. The number of parasites varied enormously in individual cases and at the different stages of the paroxysm and fever. The most common form of the parasite to appear at the commencement of the fever was the trophozoite; later, schizonts and gametocytes were seen. The parasites showed a general tendency to multiply rapidly with the fever and to reach a maximum about the sixth or tenth day of the illness, when often a progressive diminution in numbers would set in and in some cases lead to the complete disappearance of parasites from the peripheral blood-stream. Cases in which spontaneous auto-immunization developed during the course of the fever presented these features and were frequently encountered. Multiple infections of the red cell were seen in several cases at different stages of the strain. The red cells usually contained more than one parasite and often as many as six or seven were counted; occasionally two gametocytes, two schizonts, or a gametocyte and schizont may be seen inhabiting the same red corpuscle. Pigmented leucocytes and white corpuscles containing parasites in all stages of degeneration have been found in the later paroxysms.

"The susceptibility of induced malaria to treatment with quinine is remarkable. After a three-day course of treatment by the administration of hydrochloride of quinine—30 grs. on each of three consecutive days—the fever quickly subsides and the parasites rapidly disappear from the circulation. The quinine did not always prevent the next succeeding paroxysm, but nearly always postponed the time of onset and diminished its severity. The parasites show an extraordinary diminution in numbers after the first dose of quinine and as a rule completely disappear by the end of the third day. It is this remarkable susceptibility of the parasite to quinine that renders control of the fever practically impossible. In a few cases the fever and parasites exhibited a tendency to disappear spontaneously and without treatment

by quinine. Spontaneous auto-immunization of this nature took place in certain patients inoculated for the first time, and generally developed between the fifth and tenth paroxysms; the immunity, however, was not always complete, as frequently parasites increased in numbers and paroxysms reappeared within twenty-one days. Vagaries of this kind were, however, much more common in several of the seventeen cases which received a second course of treatment. The reinoculations were performed at periods varying in individual cases from twenty-two days to nineteen months after the primary injection; parasites were observed in the peripheral blood-stream of all the cases, and in 58.8 per cent. of the series several paroxysms of malaria occurred at regular and irregular intervals. Again, the fever and parasites spontaneously disappeared in nearly all the cases and the administration of quinine was rarely required.

"Relapses in inoculated malaria are uncommon and accounted for two cases, or less than 2 per cent. of the patients infected with this strain during an observation period varying from two months to three and a half years. The first case relapsed forty-two days after the last dose of quinine (total 90 gr.) and eighteen days after the fourth injection of novarsenobillon. The second patient relapsed twenty-eight days after parasites had disappeared following the administration of a short course of quinine (total 60 gr.). But the cases were treated by the usual three-day course of quinine and no further relapses have been reported. The infrequency of relapses in this form of malaria emphasizes strongly the necessity of maintaining a strain of pure tertian for therapeutic purposes. Davidson inoculated twenty cases of general paralysis of the insane with infected mosquitoes and reported thirteen (56.5 per cent.) of relapses within an observation period of twelve months. Again, Yorke and Macfie and later Yorke reviewed a series of thirty-seven patients similarly infected, and reported twenty-one (57 per cent.) of relapses in a period of observation varying from 291 to 609 days, and in the great majority of the twenty-one cases relapses recurred after treatment. Evidently mosquito malaria is more resistant to quinine than the inoculated form.

"We have been informed that many trypanosomes pathogenic to man and stock undergo a marked increase in virulence to certain species of laboratory animals when maintained in them for long periods by direct inoculation from one host to another. In some cases the alteration in virulence was attended by certain morphological changes which took place only after the strain had undergone a certain number of direct passages in the vertebrate host. It was therefore of considerable interest and importance to know whether the prolonged sojourn of *P. vivax* in man, comprising sixty direct passages during a period of three and a half years, had had any influence on the parasite, on the type of infection produced, or rendered it less effective in the treatment of general paralysis. A comparison of the infections comprising the first twenty passages with those of the last twenty passages has yielded data which indicate that the strain has undergone no change in pathogenicity or virulence or alteration in therapeutic properties during the direct passage from man to man through sixty generations. Again, the morphology of the parasite has not changed, and differs in no way from that found in naturally infected cases: Anopheline mosquitoes were successfully infected in the twelfth and fifteenth passages of the strain, but it is doubtful whether the parasite at this stage still retains the power to develop in the invertebrate intermediary host, as Gerstmann in a recent publication stresses the fact that after repeated passages from one human being to another the malarial parasite changes in such a way that it can no longer be infective to the mosquito, *Anopheles maculipennis*, or transmitted by them to man."

Climatic Bubo.

A SUBJECT which has always interested medical men in India is the so-called "climatic bubo." Some of such

cases may possibly be due to filariasis; but others do not seem explicable on that theory. In the *Journal of Tropical Medicine and Hygiene* for April 1st, 1926, there appears a very complete review of the whole problem by Dr. E. P. de Bellard, Medical Director, Beacon Sun and La Pas Hospitals, Valera, Venezuela; from which we have taken the following abstracts. The paper constitutes not only a notable contribution to the literature upon the disease, but also terminates with a very complete bibliography which will be useful to many workers. The author bases his paper upon a clinical study of 22 cases.

"Climatic bubo or subacute inguinal poradenitis is a disease of wide geographic distribution, found in all tropical countries and perhaps in many of those of the temperate zone, possibly unrecognised, masquerading under the guise of tubercular inguinal adenitis. In Venezuela it affects mostly young men of the Caucasian race recently arrived in the tropics, whilst women and children of all races are immune. Its most outstanding clinical sign is the presence in the inguino-crural region of a tumour involving several of the lymphatic glands of these groups, which at operation are found to contain numerous small abscesses scattered throughout the whole gland tissue; it is further characterized by extensive periadenitis, a tendency to sinus formation and chronic suppuration, while only mild general symptoms accompany the imposing local syndrome.

"Nicholas and Favre were the first to insist on the genital origin of the infection, and described the initial lesion or *poradentic microchancre*, which affects a variety of forms; most frequently it assumes the appearance of a small, painless, shallow, non-infiltrated ulcerated herpetiform lesion. However, it is but seldom discovered in the cases of poradenitis, be that due to the insignificance of the lesion itself and the fact that it gives rise to no symptoms, or to its evanescent character. I have discovered a typical poradentic chancre in only two of my cases and in neither was its presence suspected by the patient. Nearly all cases of poradenitis that I have seen were in men who had a long prepuce or phimosis and who kept their genitals very unclean, and under these circumstances it is very easy to overlook a microchancre situated at the balano-preputial fold which is its favourite location. But it is possible that the virus may utilize for its accession some other pre-existing venereal lesion.

"The portal of entry would seem to be unquestionably somewhere in the genital zone or its immediate vicinity; the usual location of the original bubo, affecting as it does the supero-internal group of inguinal glands, supports this view. However, in the majority of instances it is impossible to locate definitely the point of inoculation, and the most painstaking search will fail to reveal any lesion whatsoever, the bubo being the first evidence of the disease noticed.

"That poradenitis is usually of venereal origin seems most probable; that it is always so is questionable, as I have observed it in a young man who had never had sexual intercourse, and Destéfano and Vaccarezza report a similar instance. In two others of my cases the disease made its appearance several months after the last intercourse, so these could not be considered of venereal origin unless we admit the supposition that the virus may be contracted and then remain latent for long periods of time. Again, the disease behaves most unlike the other true venereal diseases: it does not attack women, and, with rare exceptions, spares natives.

"Judging by several seemingly clear-cut observations, it might be deduced that the organism producing poradenitis is harboured in the vagina of filthy women and in the smegma of men of unclean personal habits, a long prepuce greatly favouring their habitat, and that it is implanted in the lymphatic mesh and thence invades the inguino-crural nodes through some abrasion in the genital zone inflicted during coitus or through rubbing or friction in the neighbourhood of the pudenda; the infection would be especially favoured if this region were moist and macerated by heat and sweat such as attends

violent exercise, long horseback rides, or driving a truck during the hottest season of the year over rough roads.

"In my cases poradenitis always started in the supero-internal group of inguinal lymphatic glands on one side, and affected the left more often than the right (64 per cent.), eventually becoming bilateral in 22 per cent. of the cases. In 88 per cent. the inguinal glands alone were involved, but in 22 per cent. the crural glands were later affected. As a rule only the superficial groups of glands are attacked, as in but two of my series did it extend to the deep ones. On the other hand, involvement of the iliac lymph nodes is almost a constant phenomenon. Even when the disease may be properly called unilateral the glands of the opposite side are frequently found to be slightly enlarged and somewhat sensitive to pressure.

Pathology.

"In the course of poradenectomies I have observed all the stages in the evolution of the disease. The first pathologic evidence refers to a stage of congestion with some hypertrophy, the gland assumes a purplish colour and shows abnormal vascularization, and on section presents a granular appearance, diffuse studding with punctiform hemorrhages and minute areas of grayish infiltration showing early abscess formation especially towards the centre of the gland, while the cortical area is still more or less free. The capsule appears somewhat thickened, surrounded by a delicate meshwork of fine adhesions. Usually, no matter how early the case is operated on, not only is the main gland affected, but to a variable degree the neighbouring lymph nodes also show these changes. At a later stage the periglandular adhesions have become very strong and extensive, anchoring the gland firmly to its neighbours and to the surrounding tissues. The gland has increased to several times its normal size, and its surface, as well as the central ganglionic mass, are studded with numerous abscesses ranging in size from microscopic proportions to that of a pea. These abscesses are isolated from one another, separated by a zone of apparently healthy parenchymatous tissue, and contain thick, greenish or yellowish, viscid, odourless pus. When the thickened and tough capsule is stripped off, the surface of the lymph node appears roughly granular and is sometimes found covered with a greenish fibrinoplastic exudate which adheres tenaciously to the gland tissue. In the advanced stage of the fully developed disease the tumour is composed of a large conglomerate of agglutinated glands involving several, sometimes all, the glands of the inguinal and crural groups, firmly adherent and fused into one mass; this is surrounded by an atmosphere of extremely tough adhesions which anchor it immovably to all neighbouring structures, including not rarely the spermatic cord above and the sheath of the femoral vessels below. In the meshes of this periadenitis are found purulent and hemorrhagic foci, separate and distinct from each other in the beginning, but later coalescing to form more important collections. The lymph node itself will be found to contain numerous small abscesses and a large one located centrally, formed by the coalescence of several contiguous purulent foci, and to be discharging its contents through a minute sinus. In neglected cases several of these larger abscesses may have formed, each discharging pus through its own fistula. The parenchyma surrounding the abscesses is friable. The skin covering the poradentic tumour adheres to the underlying mass, sometimes assuming an oedematous tense, shiny appearance and a characteristic reddish-violet hue.

"Rarely, the poradentic gland presents a special and very different aspect: it feels firm, shows no miliary abscesses detectable with the naked eye, and on section presents a perfectly smooth, homogeneous surface of light pink colour and a velvety feel. This peculiar appearance, already noted by Favre, has been very aptly termed by him 'chair de poisson,' on account of its close resemblance to fish meat; the excised glands in my case No. 21

presented the typical 'chair de poisson' lesions. Histological sections of these glands show the typical stellate abscesses, but they are all of microscopic size.

"The material obtained at operation in 14 cases was submitted to our pathologist, Dr. C. Uribe, for study in his laboratory. Briefly the lesions characteristic of poradenitis consist of an active vascularization, a diffuse infiltration of the lymphoid and periadenitic tissue with plasma cells, with here and there a giant cell, the formation of numerous abscesses of stellate shape, an occasional gummatous lesion very similar in its morphology to those found in lymphatic tuberculosis, and the constant finding of vascular lesions such as endarteritis obliterans, thrombosis, rupture of blood vessels and hemorrhage into the lymphoid tissue of the node and into the periadenitic inflammatory zone. Certain so-called *chromatic bodies* both extra- and intra-cellular, are constantly found with the macrophages on the inner aspect of the epithelioid wall lining the stellate abscesses as well as among those which are free in the contents of the abscess. Our pathologist thinks that they may possibly bear some aetiological relationship to the disease, but other observers consider them to be remnants of disintegrated polynuclear cells. These *chromatic bodies* show well after staining with Giemsa's stain, or still better with a combination of Manson's boracic blue and cosin.

Aetiology.

"Several diseases have been accused by different authors of producing the lesions of poradenitis; syphilis, malaria, plague, tuberculosis, gastro-intestinal infections, etc., but careful clinical and laboratory studies carried out by many competent observers, and which our own experiments and laboratory work have only confirmed have proven these assumptions erroneous.

"The aetiological cause of poradenitis has not been determined. The possibility that the above described *chromatic bodies* may yet be proved to be protozoal organisms plying a pathogenic rôle in this disease is very doubtful. The pus of the closed buboes has constantly been found to be sterile, and slides made with it and with necrotic gland tissue and stained by diverse methods, as well as all cultures made in the usual and special media, have always failed to show the presence of any suspicious organisms. Inoculation experiments were carried out with the material obtained in most of my cases; white rats, guinea-pigs, rabbits, and two *Cebus* monkeys were utilized, and a fresh emulsion of poradenitic gland tissue in normal saline was inoculated into the mucous membrane of the prepuce or vagina, intra-peritoneally, subcutaneously or intra-testicularly. With the exception of three encouraging instances, all our experiments gave us negative results. First: with material obtained from Case 16, one rabbit, three white rats, and two guinea-pigs were inoculated: two weeks later one of the guinea-pigs showed a bilateral enlargement of the inguinal lymph nodes. While waiting for further developments the adenitis spontaneously disappeared within a few days. The other animals were unaffected. In the second instance, a *Cebus* monkey was inoculated into the prepuce with material obtained from Case 17 on September 6, 1924. By September 28, a tumour-like mass had developed near the root of the penis, firm to the touch and painless, while the inguinal glands on both sides were enlarged. On October 14, the lesion on the penis was unchanged, the lymph nodes had increased in size, and the skin over them remained normal and free from adhesions. The largest was excised for histological study. On October 29, a node in the right groin had markedly increased in volume, becoming painful and firmly adherent to all surrounding tissues; the preputial mass had diminished in size and had become softer. After this date all the glands receded gradually, and by the end of November, three months after the inoculation, were normal again, the monkey's health in the meantime not having apparently suffered to an appreciable degree. Sections of the gland removed showed marked vascularization, infiltration with plasma cells, scattered micro-abscesses of stellate form, and the usual

vascular lesions that characterize human poradenitis, but no chromatic bodies were seen, and polymorphonuclear cells, abundant in the human cases, were rather scarce in the tissue examined.

"On August 25, 1925, a guinea-pig and a *Cebus* monkey were inoculated in the prepuce with an emulsion of fresh poradenitic material collected at operation. The guinea-pig, kept under observation for three months, has remained perfectly well. The monkey showed no local reaction at the point of inoculation or elsewhere in the prepuce such as was observed in the first monkey experimented with, but on September 7, the inguinal glands on both sides were definitely enlarged. They gradually increased in size, and the mass on the left side became somewhat fixed to the surrounding tissues excepting the skin, which remained free from all adhesions to the underlying tumour. On October 3, four weeks after its appearance and six weeks after inoculation, the mass was removed. No definite inflammatory periadenitis was made out, but many fine, delicate adhesions were found lightly fixing the mass to its bed. The tumour consisted of a single, very much enlarged and deeply congested lymphatic node, which on section showed no visible abscesses, but numerous punctiform hemorrhagic foci.

"The mass in the right groin was not interfered with, but as occurs so frequently in human cases of poradenitis, the main focus once extirpated, the enlarged gland on the opposite side began receding at once and could not be palpated two weeks later.

"Microscopic sections of the gland removed showed well-marked generalized congestion, abnormal vascularization, and scattered hemorrhages into the parenchyma, with very few foci of apparently incipient necrosis, but no abscesses and a total absence of both chromatic bodies and leucocytic infiltration. The capsule was definitely thickened, and the connective tissue apparently increased throughout the gland. The vascular lesions were the most prominent, and dominated the picture.

"While no claim is advanced to having reproduced poradenitis in the monkey the foregoing experiments are at least encouraging and suggestive.

Symptomatology.

"The appearance of a mass in the groin accompanied by a feeling of tension and discomfort are the first and often the only signs during several days, and the patient may even be able to follow his occupation, but soon other symptoms supervene, such as persistent anorexia with marked loss of weight, profound lassitude and fever, while the tumour becomes painful on walking, though painless at rest. The fever rises to 38° or 38.5° C., and affects the continuous type with marked morning remissions, or more frequently the intermittent, with normal temperature in the morning and an evening rise. Rarely, a high temperature of the continuous type persists for many days, simulating typhoid fever.

"The duration of the fever is variable: it may disappear after three or four days, but more frequently it persists during the progressive stage of the disease and then drops to normal. But the fever may reappear at any moment, and this coincides with the extension of the pathologic process to other lymphatic glands in the same or in a distant zone. The blood-picture shows a mononucleosis of the large cell type.

"The poradenitic tumour is of a wooden hardness, firmly anchored to the surrounding structures, and on deep palpation elicits very little, if any, pain. In nearly all cases the iliac lymphatic glands are found markedly enlarged, and at times to such an extent that they form a mass as large as the one in the groin, but the pathological process in the iliac nodes does not progress beyond the stage of inflammatory congestion of the gland, and they never break down, receding to normal *pari-passu* with the improvement of the inguino-crural process. The skin glides freely over the tumour for several days, but in the advanced stage becomes adherent to the underlying mass, and when this occurs it may be assumed that extensive suppuration has already taken place; at this period the palpating finger detects in the centre of the

hard tumour a more or less circular area of doughy or waxy softening permitting indentation, and as the finger-tip sinks it detects a firm area of deep-seated softening.

fistula forms, which discharges :

of sero-pus and may close again in a day or two without leaving a trace of its former location; this may be repeated several times before the fistula becomes permanently established. Later, other fistulae may form which drain different, isolated foci of suppuration until the whole tumour may become one necrotic mass discharging small amounts of a sticky sero-pus through many sinuses. A fusion of all suppuration foci such as occurs in other forms of adenitis never takes place in poradenitis.

"Resolution of a poradenic tumour which has not progressed to the stage of extensive suppuration may take place, but the process is a very prolonged one requiring months. The usual course leads to fistulization and chronic suppuration. A characteristic of the discharging sinuses is the fact that their borders show no evidences of inflammation, the bordering skin appearing normal. The amount of pus discharged is always small, and after the first few days may be only a few drops in the 24 hours, but this suppuration is apt to continue during many weeks or months. However, the patient once free from the acute symptoms of the disease, leaves his bed to lead for the next few months the existence of semi-invalidism imposed by the essentially chronic course so characteristic of poradenitis.

Prognosis.

"This is always good as regards life, but must always be guarded as to the duration of the disease. A poradenectomy or total excision of all glands involved is the only method which offers probabilities of a prompt cure, but even timely surgical treatment does not always prevent a recurrence in some other group of lymphatic glands. Left to itself, a well-developed case of poradenitis may take from six months to one year for complete recovery.

Treatment.

"Ravaut claims to have used with success intravenous injections of Lugol's solution alternating with emetine. Emily uses intraganglionic instillations of a xylol iodoform and paraffin-oil mixture. Nicholas, Favre, Rost and Bory recommend radiotherapy in the early stages of the disease. In my experience all treatments, except a prompt radical operation, yield uncertain and unsatisfactory results. The operative treatment has been recommended by Favre, Gaté, Nicolás, Brault, Dugas, Chavanne, and others.

"Obviously, simple incision, curettage and drainage of the main focus of suppuration cannot accomplish much in these cases and is not to be advised.

"The operation of poradenectomy can be performed in the early stage of the disease under local anaesthesia, but general anaesthesia is to be preferred in advanced cases. All manipulations in the depths of the wound should be carried out with gentleness and care, as the tumour is not infrequently attached by firm adhesions to the femoral sheath, while the upper border of the mass is often found intimately attached to the structures forming the inguinal canal, and there is danger of lacerating the spermatic cord.

"The largest tumour that I have extirpated (Case 3) weighed 92 grammes and measured 10 by 4 by 4.5 cm.

"The enlarged iliac glands require no treatment, as the poradenic process affecting them recedes rapidly after extirpation of the inguinal tumour. In cases operated on early, before the involvement of many glands or the production of massive periadenitis, and in which suppuration is confined to the intraganglionic military abscesses, the wound may be sutured *in toto*, without drainage, being careful to suppress all dead space; in more advanced cases ample drainage must be supplied for the profuse lymphorrhoea which is sure to follow and last for several days. Healing by granulation in

these cases is always slow, but especially so if any portion of the affected glands was overlooked at operation, which must be a thorough one if it is to succeed in shortening the duration of the disease; and any overlooked poradenic focus will keep up suppuration and possibly act as a source of infection to other glands.

"Incipient cases operated on early and closed without drainage are cured within 10 or 12 days. More advanced cases require from two to four or five weeks for complete healing, according to the size of the cavity left by the removal of the tumour. Secondary suturing after the lymphorrhoea has ceased materially hastens recovery.

Sequela.

"The excision of a poradenic mass usually gives rise to an oedematous infiltration of the surrounding tissues with lymph, the extent varying in direct proportion to the number of glands extirpated, but it is generally confined (it has been so in all my cases) to the vicinity of the operative wound. This oedema progresses in extent for the first three or four days and then gradually recedes as the lymph finds new avenues of discharge and disappears in the course of ten to fifteen days. However, Chavanne, Ravaut, Pigeon et Tanton, Marion and Gandy, Gaté, Brouardel and Brault have reported cases of pseudo-elephantiasis of the genitals and lower extremities consecutive to the extirpation of the inguinal lymph nodes. This serious sequela has occurred weeks and even months after the operation and persisted for long periods of time, occasionally for life. This possibility, though remote, is a serious drawback to the operation, and should be clearly stated to the patient before its performance. The additional fact that it does not always insure against further extension of the disease to neighbouring glands or an invasion of the glands of the opposite side also militates against the operation, but until some other effective method of treatment is discovered, a radical poradenectomy must remain the method of choice. In spite of the risk involved, every one of the young men that I have treated preferred submitting to a radical operation that promised a quick cure rather than face the long and tedious period of semi-invalidism which entails the spontaneous evolution of poradenitis. The uniform success that I have had in my 18 operative cases has strengthened my conviction that every case of poradenitis should be operated on at once.

Conclusions.

"Subacute inguinal poradenitis is an autonomous pathologic entity of unknown aetiology, distinct from all the other usual forms of adenitis but very closely resembling pathologically a tubercular adenopathy. In the tropics the disease attacks almost exclusively young men of the white race recently arrived from colder climates. It is endemic in certain zones, with occasional mildly epidemic exacerbations. These outbreaks seem to coincide with long periods of drought and extreme heat. A long prepuce and uncleanness of the genitals strongly predispose to it. The disease is manifested by an adenitis of the inguino-crural glands, characterized by multiple, intraganglionic purulent foci accompanied by periadenitic inflammatory lesions, of a hemorrhagic and suppurative type, with the formation of dense and extensive periglandular adhesions.

"All non-surgical treatments so far tried have failed to produce uniformly satisfactory results, besides entailing serious loss of time. Poradenectomy, or the radical excision of all diseased glands, should be the treatment of election and constitutes the only procedure that promises a quick recovery."

The Steam Cautery.

An instrument which will interest all surgeons in India, and especially those who live in the mofussil, where there is no electric current, is the "steam cautery" described by Mr. H. S. Soutar, C.B.E., F.R.C.S. (Eng.), Surgeon to the London Hospital, in the *Lancet* for April

the 17th, 1926. It is an instrument with wide potentialities in Indian practice. The following notes on it are taken from Mr. Soutar's article:—

"The destruction of malignant tumours by heat is probably one of the most ancient forms of surgery, but with the introduction of methods of direct removal the actual cautery fell into disuse. Yet there are many malignant growths whose removal by direct surgery is difficult or impossible, and for these heat has again been invoked by the use of the diathermy current. Over the actual cautery this possesses the advantage of deep penetration, whilst, instead of being rapidly burnt away, the tissues are coagulated. The slow separation of the slough allows time for granulations to form, so that the tumour is converted into a foreign body and is cast off by natural processes.

"Precisely the same result may be obtained in a much simpler manner by the slow penetration of heat from a cautery maintained at a low temperature, and this is very conveniently done by a current of dry steam. For the past two years I have been using an instrument of my own device founded on this principle, and the results have exceeded my expectations. It is constructed as follows:—

"Steam is generated in a small boiler, solid 'meta fuel' being conveniently used as a source of heat. The steam is super-heated by being carried directly through the flame, and it then passes along a thick rubber tube to an insulated handle. This terminates in a nozzle on to which applicators of various forms can be screwed, and the steam, after entering the applicator, returns by the handle to the discharge tube. It will thus be seen that the applicator is maintained constantly at a temperature closely approximating to 100° C. The applicators vary in size from small points up to metal discs 3 inches or more in diameter.

Method of application.

"So long as the applicator is kept in contact with the tissues heat slowly penetrates and produces coagulation, the depth of penetration for any one applicator being simply a function of the time and of the permeability of the tissues. With the large applicators and on moist tissues penetration takes place at the rate of about one inch in ten minutes. This can be easily demonstrated upon a piece of beef-steak, and a section will show at once the complete coagulation which results, an exceedingly tough coagulum being formed.

"Though this method resembles diathermy, it differs in important details. In contrast to diathermy very large applicators may be used, the rate of penetration being slightly greater with large applicators than with small ones. With large applicators it is an exceedingly powerful machine, and I venture to think that it is the most potent appliance we at present possess for dealing with large masses of inoperable growth. The rate at which great masses of fungating carcinoma coagulate and disintegrate before it is astonishing, and yet in the end dense coagulum is left which gives ample protection to the deep tissues and allows time for their recovery, for the closure of large vessels, and for the formation of granulation tissue.

"Although the instrument was originally devised for dealing with large inoperable growths, it has been found in practice to be applicable to a number of other conditions. The depth of penetration is uniform over the surface of application and is under perfect control, so that small superficial growths and ulcers can be treated with certainty and yet without risk to the underlying deep structures. The method has been found of peculiar value in the treatment of epithelioma of the skin, especially where this arises on a scarred surface, as after the treatment of lupus and similar conditions by x-rays. We have, unfortunately, seen a large number of these cases, and they sometimes present a surgical problem of great difficulty. Excision leaves a widely gaping wound, which heals but slowly owing to the underlying fibrosis and the endarteritis which the rays have caused. Suture of the margins is useless, and grafts take but poorly. We have found that destruction of the growth by the

steam cautery, easily carried out under local anaesthesia, leaves a much smaller wound, protected by a tough coagulum. When this separates a granular surface will be found on which a graft takes readily.

Illustrative Cases.

"The following cases illustrate a few of the applications of the method.

Case 1.—A. B., a man aged 53. For 33 years he had suffered from lupus which had extended over practically the whole of his face and neck, and the whole of this area was now covered by the scars of healed lupus. He had been treated with Finsen light at the London Hospital and with x-rays elsewhere. For five years a nodular growth had been gradually spreading above the left angle of the mouth. A small part of the nodule was excised and the remainder and the whole of the base treated with the steam cautery. Sections showed it to be a squamous carcinoma. The cauterised area healed rapidly and after nine months it cannot be distinguished from the rest of the surface. There is no trace of recurrence.

Case 2.—C. D., a man aged 40. Ten years ago he had prolonged treatment with x-rays for syphilis barbae, and the whole of the beard area was covered by scar tissue. For a few months an ulcer had been spreading in the left malar region; it was now about one inch in diameter, and had all the characteristics of an epithelioma. It was treated by the steam cautery and four weeks later a Thiersch graft was applied. The graft took at once. Six weeks later, though still perfectly healed, the appearances suggested a recurrence of growth below the graft. For safety's sake the graft and the tissue beneath it were excised. The section showed nothing at all but fibrous tissue covered by epithelium. The small wound left healed rapidly.

Case 3.—E. F., a man aged 47. Twenty years ago lupus began on the left side of his face and spread until the whole of the cheek and the left side of the neck were involved. It was treated with x-rays and this area was converted into scar-tissue. For two and a half years a warty out-growth on the scar had steadily increased in size, until it now formed a huge fungating mass extending from the nose to the mastoid process and down into the neck. The whole of the growth was removed with the steam cautery and six weeks later it was found possible to graft three-quarters of the area, the grafts taking well on sound granulation tissue. The growth, however, spread further down the neck and involved the vessels, so that in spite of the local success further treatment of the case had to be given up as hopeless.

Case 4.—G. H., a woman aged 24. For a year she had suffered from hyperthyroidism with tachycardia and slight enlargement of the thyroid. She had been treated on several occasions with x-rays, but after one of these she noticed a severe erythema of the epigastrium. The treatment was discontinued for a time, but on its resumption the erythema recurred, the skin broke down, and a deep ulcer formed. It was then found that the shield of the x-ray tube was defective. In the epigastrium there was an ulcer three inches in diameter and extending deeply into the tissues; the recti muscles themselves were exposed. It was thought that such an ulcer was almost sure to become malignant, but as it was grossly septic, and as its effective excision must at least reach the peritoneum, it presented a very difficult problem. By means of the largest applicator of the steam cautery the whole ulcer was dried up and rendered sterile, and this huge sterile coagulum was then excised. On freeing the deep tissues and undercutting the skin it was found possible to close the wound and it healed by first intention, leaving only a median scar.

Case 5.—J. K., a man aged 21. A year previously he had been thrown from a motor-bicycle and his face badly scored. The right side of the face and the left side of the nose were covered by deep scores rendered very noticeable by the fact that they probably tar, situated in the derm extensive scarred areas was out of a small point attached to the skin was carefully coagulated so that

pigment sloughed out. The result was extraordinarily good, the resulting white scars being scarcely noticeable.

Wide Range of Utility.

"It will be seen that the steam cautery has a wide range of utility. With large applicators it can be used as an instrument of great power for the destruction of large masses of malignant growth. With small points it can be used in the most delicate manipulations of facial surgery. It has probably many applications in the treatment of pathological conditions of the skin and the accessible mucous membrane, and under certain circumstances its powers of sterilisation can eliminate gross sepsis and greatly simplify surgery. It appears to be capable of accomplishing all that can be done by diathermy, with greater facility, with less risk, and at a minute fraction of the cost.

The instrument was produced in my experimental laboratory at the London Hospital. It can now be obtained from Messrs. Allen and Hanburys."

Bronchomoniliasis.

(Journ. of Trop. Med. and Hygiene, 1st April, 1926, p. 109.)

WITHIN the last twenty years it has been ascertained that affections of the bronchi and lungs may be definitely associated with the presence of fungi in the sputum, and to the various conditions so produced the name of bronchomycosis is now applied. Of these fungi the organisms known as *Monilia* have contributed most frequently to the number of cases of bronchomycosis which have been recorded producing the form of bronchomycosis known as bronchomoniliasis, but with increasing knowledge and experience of these fungi, recent investigations have shown that quite a variety of fungi belonging to different species, genera, families and orders may also be encountered in these bronchomycotic infections.

Bronchomoniliasis was first described by Castellani in Ceylon in 1905, and since then it has been met with by many investigators not only in tropical and sub-tropical, but also in temperate regions. These cases have been described in France by Pinoy, in South Africa by Pijper, in West Africa by Macfie, in Egypt and the Sudan by Chalmers, MacDonald and Earah, in Italy by Jacono and by Castellani, Douglas and Thompson, in America by Johns, Baggs and by Picoff and Simon, while a thorough study of the disease in India has been made by Tarakanath Sur. The *Monilia* which produce bronchomoniliasis are comprised of fungi which are characterised by the sporophores being simple or sub-simple and producing by constriction at their extremities a chain of large lemon-shaped conidia often provided with a disjunction apparatus. It would seem, however, that there is at present a general tendency to extend the term *Monilia* so as to include all the organisms of the genus *Oösporacea* (Saccardo, 1886), the vegetative body or thallus of which appears in the lesions in the tissues, i.e. in its parasitic life, as a mass of mycelial threads or free-budding forms, some of the mycelial filaments being long and branched and often presenting arthrospores. In cultures on the ordinary laboratory media, i.e., in their saprophytic life, they mostly consist of yeast-like roundish or oval bodies, while mycelial filaments are usually scanty. An investigation of the biochemical characters of the *Monilia* shows that they often ferment glucose and other carbohydrates with the production of gas, and on the basis of these characters the *Monilia* may be classified into several groups. It may be pointed out that *Monilia* which present the same biochemical characters may differ enormously as regards pathogenicity, some producing a severe infection when inoculated into the rabbit or guinea-pig, whilst others appear to be quite harmless. A critical study of the symptomatology of the cases of *Monilia* infection shows that they may be differentiated into two types, severe and mild, although cases of intermediate severity may

also occur. The severe type of infection closely simulates, and may be mistaken for, phthisis. There is emaciation, hectic fever and hæmoptysis. Physical examination of the chest reveals the presence of patchy dullness with fine crepitations and pleural rubbings. Cases of this type have a fatal ending. In the mild type there is no fever, the general condition remains good. The sputum is mucopurulent and free from blood and is often scanty. Physical examination of the chest is negative or merely reveals the presence of a few râles. After lasting for some weeks or months resolution may occur spontaneously or the severe type of the disease may supervene.

The diagnosis of bronchomoniliasis is based on the results of examination of carefully collected sputum showing the presence of monilia and the absence of tubercle bacilli. The sputum should be collected in a sterile receptacle after thorough gargling with warm sterile water, and it should be examined immediately. Microscopic examination of such sputum may reveal the presence of roundish or oval yeast-like cells, often presenting a double contour, and sometimes a few mycelial threads, or it may be quite negative and the fungus can only be found by the employment of cultural methods, which should never be neglected. The mere presence of a monilia in the sputum, however, should never be considered sufficient to establish the diagnosis of a primary bronchomoniliasis. It has been shown that when a monilia has been discovered in a sputum properly collected and examined three possibilities exist. In the first place the monilia, as shown by animal inoculation, is non-virulent and non-pathogenic. In such conditions the organism merely lives saprophytically in the bronchi, constituting a saprophytic moniliasis. Secondly, the monilia, though virulent, may represent a secondary infection, in which case intravenous injection into rabbits causes death of the animal, but intrapulmonary injection does not produce any nodular pulmonary lesions and the animal dies from a general monilial septicæmia. This secondary moniliasis is comparatively common in advanced pulmonary tuberculosis. Lastly, the monilia is the cause of the broncho-alveolar lesions, when intrapulmonary injection in the rabbit produces a characteristic nodular condition in the lungs. This condition constitutes primary bronchomoniliasis. Whatever the variety of monilia concerned in the production of bronchomoniliasis the treatment consists in the administration of potassium iodide in fairly large doses, together with the exhibition of balsamics, particularly creosote. Incipient cases respond well to this treatment and in them the prognosis is usually good; in advanced cases, on the other hand, the prognosis must be more reserved. Auto-genous monilia vaccines are apt to be disappointing, being only very occasionally useful.

When a patient who is not in a very advanced stage of the malady does not respond satisfactorily to the iodide-creosote treatment, further investigations into the ætiology of the condition should be carried out, with a view to discovering the presence of mixed infection, since cases of true mixed infection, for instance, bronchomoniliasis and broncho-spirochaetosis and bronchomoniliasis and broncho-actinomycosis have been encountered, and in such cases the response to treatment has been unsatisfactory and the prognosis rendered more serious.

The Treatment of Amœbic Dysentery by Auremetine.

By GRAHAM WILLMORE, M.D., M.R.C.P., and

W. HARRISON MARTINDALE, Ph.D., Ph.Ch., F.R.S. (British Med. Journ., March 20th, 1926, p. 525.)

FAIRBROTHER and Renshaw's experiments showed that auramine killed *Paramœcia* in fifteen minutes at 1 in 20,000, while a 1 in 500 solution of phenol is necessary to kill them in fifteen minutes. The next step was to prepare a compound of auramine with emetine for oral administration, and a dark maroon powder, stable and

insoluble in water was prepared. This substance for which the name "auremetine" is suggested, is a combination of the hydriodide periodides of emetine and auramine, and has approximately the following composition:—

Emetine	28 per cent.
Auramine	16 " "
Iodine	56 " "

Major Brown reported that this drug is inhibitory to the growth of free-living amoebæ nearly to the same extent as emetine or conessine—the active principle of *kurchi* bark—under the same conditions.

It is to be noted that the drug contains only 28 per cent. of emetine, the constituent most poisonous to the higher animals.

The administration of auremetine is practically free from any objectionable side-effects, such as vomiting, nausea, abdominal pain, or purging. It is also much less depressing than emetine administered hypodermically, and it is not necessary to keep the patient in bed on this account alone.

The method followed since the summer of 1924 is usually as follows, modified to suit individual cases:

1. "Acute" cases—that is, those with blood, mucus, and *Entamoeba histolytica* in the stools, or found in scrapings at sigmoidoscopy—are given:

(a) Auremetine 1 grain in soft gelatin capsule four times daily after food, on alternate days for seven days, and then daily to a total of 40 or 60 grains ingested.

(b) Stovarsol 4 grains three times daily for seven days, on alternate days with the auremetine. Previously the authors gave 4 grains twice daily for ten days, alternating with the auremetine days, or even to fifteen days.

(c) On stovarsol days a rectal injection of emetol, 2 drachms (=1 grain emetine base), in ether 6 drachms and olive oil 12 ounces. (Time retained to be charted.)

(d) "Panama bismuth" three-hourly for twenty days, and then three times daily.

2. "Chronic" or cyst-carrying cases are given:

(a) Auremetine, and (b) stovarsol, on alternate days as described above.

(c) "Panama bismuth," three times daily before food.

3. When hepatic involvement is present 1 grain of emetine hydrochloride by intramuscular injection, on alternate days for six days (that is, 6 grains in all), may supplement or replace the emetol.

In a series of 40 cases no less than 37 were clinically and microscopically freed from signs of the disease up till 6 months or more after the course. It is claimed that the present method of treatment—especially the introduction of auremetine—has given some gratifying and more hopeful immediate results than any other essayed.

Incidence and Spread of Cholera in India.

(British Med. Jour., May 1, 1926, p. 784.)

At a meeting of the Section of Epidemiology and State Medicine of the Royal Society of Medicine on April 23rd, Sir Leonard Rogers read a paper on the conditions influencing the incidence and spread of cholera in India. The paper embodied the results of the monthly mortality returns for the last fifty years, together with an examination of the coincident meteorological data and of the views of previous writers on the subject.

In the cholera epidemics in India in 1817-19, and subsequently down to those in 1859-71, described by Bryden and Cornish, the disease appeared to have spread from its home in Lower Bengal over North-Western, Central, and Southern India in a series of waves of two to four years' duration at somewhat irregular intervals, the endemic area, according to Bryden, being limited to Bengal and West Assam.

Since 1877 the monthly mortality for every district in India had been recorded, furnishing far more detailed information than the army and jail figures of Bryden's time, but they had not hitherto been utilized for a comprehensive study of the incidence and spread of cholera in India such as was here attempted.

A study of the average monthly cholera incidence and its comparison with the rainfall, temperature, and humidity in forty-five divisions of India showed (a) no uniform relationship to rainfall, as the disease during the south-west monsoon was at its maximum in most parts of India, but at its minimum in Lower Bengal, and (b) a regular great decline or disappearance of the disease in all parts of India when the absolute humidity fell to or below 0.400, such dryness of the atmosphere preventing the epidemic prevalence of the disease. The months in which cholera showed a great increase after the winter quiescent period in North-West and Central India were those in which the absolute humidity first rose to over 0.400, the seasonal increase in the epidemic areas being thus explained quite irrespectively of any spread from Bengal.

The average annual incidence of cholera was found to be highest in Assam, Lower Bengal, Bihar and the eastern sub-Himalayan divisions of the United Provinces in Northern India, and in South-East Madras, all of which were areas with few or no months of absolute humidity below 0.400 and consequent continued prevalence of the disease throughout the year.

The present endemic areas—that is, areas in which the disease had never been absent for a single year in three recent decades—included the areas of high incidence already mentioned of Bengal, the United Provinces, and Madras, together with the low-lying west coast of Bombay, all with a constant absolute humidity of over 0.400, so the endemic areas were now far more extensive and scattered than the parts of Assam and Bengal indicated by Bryden in 1869.

The epidemic areas—that is, areas in which severe outbreaks occurred frequently after a year or two of complete absence of the disease—included the south and west of the United Provinces, all the Punjab, the Sind, Gujerat, and Deccan divisions of Bombay, and the whole of the Central Provinces.

Study of the figures showed a larger number of epidemics in the United Provinces than in Lower Bengal, and demonstrated that a number of the outbreaks spread from the endemic area of the United Provinces towards the Punjab, decreasing in intensity in proportion to the distance of the divisions from the United Provinces and the dryness of their climate. Similarly it was shown that the Central Provinces in recent decades were sometimes invaded from the east from the southern Orissa division of Bengal, occasionally from the north from the Deccan divisions, contrary to Bryden's conclusion that cholera always spreads from Bengal to the north-west over the United Provinces, or to the south-west over the Central Provinces to Bombay with the monsoon winds, the facts on which he based his theory being now explained by the effect of low absolute humidity in inhibiting epidemics.

The three most severe epidemics of modern times were next considered in the light of the foregoing data and in connexion with the meteorological conditions associated with them: the spread of the 1875-77 epidemic was mapped out and shown to have spread largely through pilgrims from separate endemic foci north-west from Bengal and the United Provinces, east and south from Bombay, and north from Ceylon or Southern Madras, and in each area of very high incidence the epidemic was shown to be associated with great deficiency of the previous rainfall, accompanied by drought with bad water supplies, and often with famine. That of 1891-92 was spread mainly in the first year by a rarely occurring great Ganges pilgrimage, aided by deficient rains, and in the second year by continued deficient rainfall, but especially by the Hardwar pilgrims, and the most severe epidemic of all, in 1900, was once more associated with very exceptional failure of both the monsoon and the succeeding winter rains over very large

areas of India. A table was exhibited showing the epidemic prevalence in each of the forty-five years in which the total cholera mortality in India was much over the average, and out of twenty-five infected areas, in no fewer than twenty-four previous greater or less deficiency of the rains preceded the cholera exacerbations, and in the one exception in the United Provinces, in 1894, very exceptionally high humidity throughout the winter months was followed by unique early recrudescence increase of the disease culminating in an epidemic.

By watching the climatic conditions influencing the seasonal and annual incidence of cholera in any area to which attention had now been drawn, increased or epidemic prevalence could usually be foreseen in time to take steps to lessen its spread, especially by pilgrims, by inoculating them against the disease before attending religious and other gatherings in cholera infected districts. The Punjab, Sind, Gujerat, and Deccan divisions of Bombay, and the Central Provinces, so liable to invasion by epidemics, should especially endeavour to secure a wider application of this simple means of lessening the cholera mortality. The sanitation, and especially the provision of a pure water supply, in all important pilgrim centres should be a first charge on imperial and provincial revenues under reliable sanitary administration.

Colonel Gill, after paying personal tribute to the value of the Rogers treatment in cholera, referred to the gradual development of the view that cholera in India had some relation with meteorological conditions, and he recalled by way of comparison the work of the Plague Commission, which showed that the tension of aqueous vapour must be at least 0.36 or thereabouts before an epidemic could occur. In plague, and also, as he himself had recently shown, in malaria, the absolute humidity exercised its effect on the insect vector, but he confessed he saw some difficulty in explaining the observed correlation in cholera, unless it could be shown that the susceptibility of the human being responded in some way to changes in the humidity of the atmosphere. He strongly urged that further inquiry should be made into this question.

Colonel Graham said that inquiries were now in progress in three districts of India with a view to elucidating the question of the endemicity of cholera. He referred to the interesting work which had recently been done in Manila on the non-agglutinating vibrios and their rôle in the causation of true cholera epidemics. He emphasized the difficulty of inducing the ryots to consent to inoculation when cholera was absent. Trials were now being made, however, with Besredka's oral vaccine in Madras under the supervision of the Director of Public Health, and the results would be studied with great interest.

Dr. Wheaton and Fleet Surgeon Home also contributed to the discussion, and Sir Leonard Rogers briefly replied.

The Function of the Blood Platelets.

Lancet, 20th March, 1926, p. 604.

At a pathological meeting of the Liverpool Medical Institution held on February 25th, 1926, Dr. Howell Evans read a paper on "Recent Advances in Knowledge of the Blood Platelets," with special reference to hæmorrhagic diseases and pathological thrombosis. Discussing the origin and specificity of the platelets, he mentioned especially the experimental work of Ledingham, Bedson, and Robertson, which, he said, afforded final proof that the platelets are separate blood elements. He then described the morphology of the platelets and a simple method of enumeration. Apart from their known function in connexion with blood coagulation, their importance in preserving capillary tone was important, capillary leaking and increased bleeding-time being associated with deficiency. When the platelet count was very high, on the other hand, the capillaries seemed to be tightened up, and bleeding time was much diminished. Dr. Evans enumerated the phenomena associated with thrombocytopenia or platelet

deficiency as follows: (1) slightly delayed coagulation time; (2) prolonged bleeding time; (3) failure of clot retraction; (4) diminished capillary resistance; (5) spontaneous capillary hæmorrhage. He showed that in a series of ten cases of primary and secondary purpura, with low platelet counts, the coagulation time, though usually stated to be normal, was in reality moderately delayed. The delay did not, however, approach the delay seen in hæmophilia, where the platelets were normal in numbers, but qualitatively abnormal. After classifying the causes of thrombo-cytopenia and discussing the primary disease, idiopathic purpura hæmorrhagica, Dr. Evans summarised the reported results of splenectomy for his condition and described two recent Liverpool cases in detail. Turning to conditions in which there was a rise in the platelet count, he pointed out that in certain of these conditions—namely, the convalescent period after infections such as typhoid and pneumonia, chlorosis, and certain forms of splenic anaemia—spontaneous thrombosis frequently occurred. In a series of six cases after splenectomy he had observed a definite shortening of coagulation time associated with high platelet counts. In one of these cases, a splenic anaemia of the Banti type, the platelet count persisted after splenectomy at a level of about 1,500,000 until the thirtieth day, when the patient died from mesenteric thrombosis. Similar fatalities after splenectomy in splenic anaemia associated with persistently high platelet counts had also been reported by Rosenthal. These facts showed a definite correlation between high platelet levels, shortened coagulation time, and clinical thrombosis, and emphasised the need for studying the platelet factor in its relation to all cases of pathological thrombosis.

Further Work upon the Cancer Problem.

INDICATIONS from many quarters appear to show that advances with regard to our knowledge of the ætiology of malignant tumours are now being made so rapidly that it is not too much to hope that the solution of the cancer problem is within sight. In 1911 Rous, of the Rockefeller Institute, showed that a true spindle-celled sarcoma could be transmitted from fowl to fowl by means of a filtrate freed from cells by filtration, thus suggesting that the virus of sarcoma was filtrable and infective. In 1925 the papers of Gye and Barnard appeared; these workers were able to cultivate *in vitro*, as well as to photograph by a special technique, an ultramicroscopic filtrable organism which occurs in association with the Rous chicken sarcoma, No. 1.

In the *Canada Lancet and Practitioner*, Vol. 66, No. 2, February, 1926, Drs. T. J. Glover, M. J. Scott, J. Loudon, and J. M. McCormack make a further and interesting contribution to the problem. Material obtained from a Rous chicken sarcoma was ground up with sand in a porcelain mortar, well diluted with Ringer's solution, and passed through a Buchner filter in which had been placed layers of filter-paper, pressed pulp and sand. The clear filtrate thus obtained was injected into the breast muscle of a number of birds with the result that sarcoma developed in these birds in from two to three weeks. This served as the source of material for study, transplants, filtration experiments, etc. The growths were in all respects true spindle-celled sarcomata corresponding to the original strain.

From filtrates from such tumours these workers were able to obtain, isolate and culture an organism which is very pleomorphic, Gram positive, and which was also obtained in material from cases of human carcinoma, mouse carcinoma, rat carcinoma, human sarcoma, and rat sarcoma; also from the blood of the hosts of these malignant growths. The life-cycle of this organism shows (a) a bacillus-like stage, (b) a spore or coccus-like phase, (c) a spore-sac stage, and (d) a filtrable phase. In the bacilli small elliptical spores form which tend to develop until the bacillary phase is lost. In old slant cultures kept for some time, small round or pear-shaped spore-sacs occur among which can be seen a few

hyphæ. On sub-culture from such cultures, with 24 to 48 hours the spore-sacs have disappeared, and a culture of young spores results, followed at 48 to 72 hours by the bacillary phase. The bacilli are motile and grow best at a temperature of from 35° to 39°C. The filtrable phase, in which the organism is invisible, appears to correspond to that described by Gye and Barnard.

Finally, when the clear transparent filtrate from a Rous chicken sarcoma is treated with chloroform and heated on a water-bath at 40°C., the organism is not killed but is attenuated and is now incapable of producing growths upon inoculation; but when the organism as cultivated from the chloroform-and-heated filtrate is passed through suitable culture media it again becomes virulent.

Reviews.

MODERN MEDICINE: ITS THEORY AND PRACTICE.

—Edited by Sir William Osler, Bart., M.D., F.R.S. Third edition, thoroughly revised. Re-edited by Thomas McCrae, M.D. Vol. III—Diseases of Metabolism—Diseases of the Digestive System. London: Henry Kimpton, 1926. Illustrated. Pp. 1052. Price, £12 12s. net for complete set of 6 Vols. and Index.

THE reviewer was perhaps a little disappointed after reading the list of contributors to this volume to find that Sir Humphry Rolleston was the only contributor at present holding an appointment in a university or hospital in the British Isles. It is quite obvious however that the volume has in no way suffered by this shortage of British contributors; the contributors are all men whose names are well known in medical circles not only in Canada and America but also in Europe and the other continents. The work of a reviewer of a book of this nature is a very difficult one; he finds it very difficult to indulge in that little device—by which he demonstrates his own erudition—of picking out what he considers flaws in the arguments of the writer or making additional suggestions as to treatment. Take for example the chapter on diseases of the œsophagus; the writers of this chapter are Dr. Chevalier Jackson, who is either Professor or Teacher of Esophagoscopy and Bronchoscopy, or Visiting or Consulting Bronchoscopist and Esophagoscopist to at least half a dozen Schools, Universities and Hospitals, and Dr. Louis Clerf who holds almost as many similar appointments. One feels that if Dr. Chevalier Jackson omitted any point of importance the omission must inevitably have been noticed by Dr. Clerf; the reviewer can therefore only accept their statements and bow, although perhaps at the same time he might state that their treatment of the subject is both clear and thorough.

Chapter I consists of a hundred pages of a very clear exposition of modern ideas on metabolism. The chapter as it stands would scarcely be out of place in a modern handbook of physiology but it is nevertheless a very necessary and welcome introduction to Part I of this volume, which deals with diseases of metabolism. The diseases that are dealt with are diabetes, gout and obesity. One is rather relieved to find that of the 12 pages on the treatment of diabetes only 1½ are devoted to insulin. The tendency, in this country at any rate, has lately been to look upon insulin as the only treatment for the condition and to regard other details as somewhat tedious and totally unnecessary.

The second part of the book is devoted to diseases of the digestive system: the subject is divided into chapters on diseases of the mouth and salivary glands, diseases of the œsophagus, functional and organic diseases of the stomach, diseases of the intestines, pancreas, peritoneum and, in one chapter, diseases of the liver, gall-bladder and biliary ducts. There is also a chapter on sprue and one on visceroptosis and allied

diseases. The chapter on the treatment of sprue is, in the opinion of the reviewer, somewhat disappointing. Sprue is a disease for which there are 365 "infallible" cures; one patient will improve on rest, milk and fruit juice, another on parathyroid and calcium lactate, yet another on vaccine treatment and so on and so forth. If the patient is lucky he receives the right treatment—for his particular case—early, if he is unlucky it may be necessary for him to survive 364 wrong forms of treatment before receiving the right one; this he frequently fails to do. It is the disease of all others which lends itself to quackery and more than this it tends to turn the honest physician, who has heretofore tried to follow scientific methods, into a quack. Facts however must be faced and it seems a pity that the writer has not seen his way to include a number of other forms of treatment that are based on scientific considerations and have met with success in practice.

The subject of medicine does not often lend itself readily to humour, and forced or misplaced humour in a volume of this nature would be deplorable but one is more than willing to forgive Dr. Du Bois for the following:—"The long-winded discussion as to whether or not alcohol is properly called a food has nothing to do with the prohibition question, although it has long befuddled the partisans of both sides."

This volume is a worthy companion to the two that have already been reviewed in this journal. We have no hesitation whatsoever in advising the practitioner or consultant, who is contemplating the purchase of a system of medicine, to purchase this one.

MODERN METHODS OF AMPUTATION.—By T. G. Orr, A.B., M.D., F.A.C.S. St. Louis: The C. V. Mosby Co., 1926. Pp. 117, with 25 illustrations. Price, \$3.50.

THROUGHOUT this excellent monograph the author has rightly insisted on the attainment of good functional results. He points out that amputations should be so planned that artificial limbs can be fitted with the preservation of the utmost function. He has but briefly mentioned the classical amputations which give poor results.

In the first chapter the author describes the indications for amputation, the treatment of the various tissues during the performance of an amputation, suturing, etc., and in the second chapter amputation stumps which lead to disability are dealt with.

In the third and fourth chapters he describes the amputations of proved worth of the upper and lower extremities.

Short chapters follow on cinematoplastic amputations, artificial limbs, and artificial limb fitting.

This book is eminently suited to the requirements of the general practitioner who is so frequently called upon to perform amputations at short notice, and will give him that up-to-date help which the ordinary textbooks fail to do. It is a cheap and handy-sized volume, printed in good type.

THE CLINICAL EXAMINATION OF THE NERVOUS SYSTEM.—By G. H. Monrad-Krohn, M.D., M.R.C.P. (Lond.), M.R.C.S. (Eng.). London: H. K. Lewis & Co., Ltd. Pp. xvi plus 201, with 52 illustrations including 10 plates. Price, 7s. 6d. net.

THAT this little book has reached a third edition is sufficient evidence that it successfully fills a *niche* in the ever growing library of the student and practitioner.

The author is a Swedish neurologist of European reputation, and having studied for many years in England he has written the book himself in the English language.

It is therefore not a translation but a presentation of European methods slightly adapted to suit English idiosyncrasies. He describes a routine method of clinical examination of the nervous system.

There can be no doubt that such a routine is essential to the neurologist, and here we find a simple and straightforward method which is suitable for all cases.

SEPT., 1926.]

The ordinary bed-side methods for examining the cranial nerves, the motor and sensory systems, and the various reflexes follow.

There are very good chapters on the electrical reactions and the examination of the cerebro-spinal fluid.

The illustrations are well chosen and beautifully reproduced, especially those from a cinematograph film showing the emotional movements of the face in different forms of hemiplegia.

The book should be very useful to all students preparing for higher examinations, and to those specially interested in neurology.

H. H.

DIATHERMY, WITH SPECIAL REFERENCE TO PNEUMONIA.—By Harry Eaton Stewart, M.D. Second Edition. New York City: Paul B. Hoeber, 1926. Pp. xx plus 228, with 45 illustrations and 15 charts. Price, \$3.00 net.

THIS volume follows the same author's "Physiotherapy." We have heard, with considerable interest, of the results achieved by diathermy in the treatment of lobar pneumonia, particularly in the United States, and welcome this volume which comes from the fountain-head of research work on the subject. The results of this form of treatment have been remarkable. In ninety-six per cent. of the cases treated, the temperature started to come down immediately by lysis. In all cases treated by the author at the U. S. Marine Hospitals, New York, only two deaths occurred where treatment was started on the third day of the disease or earlier. The method has been found to be especially effective in lobar pneumonia. There is immediate symptomatic relief; sleep is much improved and the patient is much more comfortable. Two to three treatments per day, each of 30 to 40 minutes' duration, are given, without disturbing the patient, who remains in bed. Some cases are treated every three or four hours during the day. The author advocates the use of a soap and water lather between skin and electrode—this is contrary to the usual European practice of employing lint in several layers soaked in ten per cent. saline solution.

Medical diathermy of other parts is well described. There is also a section on surgical diathermy.

Perhaps the most valuable part of the book lies in the detailed case histories of pneumonia at the end. Both the lobar and bronchial types have been treated, and in the great majority of cases the author's results show a much improved prognosis where diathermy is employed.

E. G.

NURSERY GUIDE FOR MOTHERS AND CHILDREN'S NURSES.—By Louis W. Sauer, Ph.D. St. Louis: The C. V. Mosby Co., 1926. Second Edition. Pp. 206. Price, \$2.00.

In an excellent little book of 206 pp., entitled "Nursery Guide," Dr. Louis W. Sauer has given to mothers and children's nurses admirable advice on the bringing up and training of the infant and the young child.

Especially good are the first three chapters which should be carefully read, marked, learned, and inwardly digested by every mother, whilst many a medical man may gain considerable knowledge from them.

The author points out how in many cases mothers allow such diseases as continued fever, nasal or aural discharges, intestinal disturbances, and skin affections to persist for weeks under the mistaken idea that they are the natural accompaniments of teething, and how often material damage has been done before the ignorance of the mother has been corrected. He also shows that many ailments such as restlessness, sleeplessness, and diarrhoea may be the direct result of excessive overclothing of the infant, which is a very common error on the part of the mother, and how a careful perusal of this little book will enable her to avoid these and many other pitfalls which may assail her when bringing up her baby.

The chapters on artificial feeding, nutritional disturbances, and common ailments are, we consider, a little too technical for the non-medical mother to understand fully, and we advise her to call in the physician before making any drastic change of diet, or before making a definite diagnosis from the description of diseases given in the book, and prescribing treatment herself.

It will be noticed that Dr. Sauer allows a four-hourly interval between the feeds of an infant from the commencement. This is interesting in view of the fact that the three-hourly interval is almost universally advocated, and we are disappointed that Dr. Sauer has not given his reasons for allowing the four-hourly interval.

The book contains some well thought out dietaries for children up to the age of three years, and also for the ailing and underfed child.

In the last chapter is a comprehensive list of the common poisons and their antidotes, and the mother is advised regarding the proper methods of treatment which she should adopt before the arrival of the physician.

There is an appendix in which are given some useful weight charts and tables, and there are seventeen excellent illustrations.

We have no hesitation in stating that we consider this to be an admirably compiled little book, and that it should be in the possession of every young mother.

MESSRS. WILLIAMS AND WILKINS CO.'S PUBLICATIONS.

WITH reference to the review, on p. 195 of our issue for last April, of Professor Vivian Hill's monograph on "Muscular Activity," Messrs. Baillière, Tindall and Cox, London ask us to state that they hold the exclusive agency in India, as well as in the United Kingdom, and other parts of the world for the sale of all Messrs. Williams and Wilkins Co.'s publications. The English price of Professor Hill's book, which was not quoted in our review, is 12s. 6d. net.

Together with their letter, Messrs. Baillière, Tindall and Cox forward a copy of their catalogue of publications in medicine and the allied sciences. This comprises four sections; medical, dental and nursing; veterinary, foods and food inspection, botany and agriculture; science in general and miscellaneous; and periodicals and reports. The catalogue is very complete and is also well indexed. It is issued free on application to the publishers, Messrs. Baillière, Tindall and Cox, 8, Henrietta Street, Covent Garden, London, W. C. 2.

Our readers who are contemplating the purchase of any of Messrs. Williams and Wilkins Co.'s books would therefore do well to deal direct with Messrs. Baillière, Tindall and Cox. Their catalogue will also be of interest to medical practitioners in India.

INFANT WELFARE.—By Hazel H. Chodak Gregory, M.D., M.R.C.P. London: H. K. Lewis & Co., Ltd., 1926. Pp. xi + 142. Price, 4s. 6d.

In this little book, the author outlines, in an admirable manner, the general lines on which a baby welfare clinic should be conducted.

In the introduction to the book she lays great stress on the necessity of the medical man or woman in charge of the clinic being thoroughly conversant with all the normal conditions of childhood as he or she is far more often consulted as to whether the child is going on all right, than in a case of sickness.

The subject-matter of the book deals with all the questions which are likely to be asked by the anxious mother concerning the welfare of her child, and the way in which to satisfy her anxiety.

The duties of the health visitor are also enumerated, and the medical man in charge of the clinic strongly advised to work in with her, as she can greatly influence his advice to mothers by informing him of the true conditions of their homes.

There is a short chapter dealing with the feeding of children after they reach the stage of weaning which is very welcome as most of the books which have been written on the feeding of the young child give no hint as to the proper feeding for a child after it has been taken off the breast and bottle feeding.

On the whole this little book is a collection of excellent advice, not only on the treatment of the ailments of childhood, but also on the method of preventing such ailments by a carefully run, sympathetic baby welfare clinic.

We must however point out that owing to the different conditions of living which prevail in the East, Dr. Gregory's book is likely to be of far more value to a medical man practising in Europe, than to one practising in Asia.

MODERN METHODS OF FEEDING IN INFANCY AND CHILDHOOD.—By D. Paterson, B.A., M.B. (Edin.), M.R.C.P. (Lond.), and J. F. Smith, M.R.C.P. (Lond.). London: Constable & Co., Ltd., 1926. Pp. 106. Price, 7s. 6d.

THIS book is chiefly remarkable for a number of tables dealing in a most accurate fashion with the composition of human and cow's milk, and also with the constituents of all the better-known artificial milks and cereal foods, and last but not least, the dietary for a child of from one to five years is carefully tabulated.

Each and every constituent of human milk is carefully described and compared with the corresponding constituent of cow's milk, and the various artificial foods, quite rightly to the detriment of the latter.

The authors lay great stress on the ante-natal care of the mother, particularly as regards breast secretion, and after the birth of the baby, the hygiene of the nursing mother is specially mentioned.

All headings are clearly and concisely arranged, and any point of particular importance is printed in italics, which serves to bring it home more quickly to the mind of the reader.

The authors have, however, only barely mentioned the colostrum, and are inclined to deprecate the importance of this fluid. They regard it as merely an immature secretion, and make practically no mention of the considerable immunity properties which most writers ascribe to it; and dismiss it with the remark that it is of some value in preventing loss of weight in the newly born.

While this book does not contain any new facts or theory on the feeding of the young child, the arrangement of the various tables, and the clear way in which the subject-matter is placed before the reader make it an excellent little book of reference, and we can strongly recommend it for this purpose to the general practitioner.

A DESCRIPTIVE ATLAS OF VISCERAL RADIOGRAMS.—By A. P. Bertwistle, M.B., Ch.B., F.R.C.S. (Edin.), and E. W. H. Shenton, M.R.C.S., L.R.C.P. London: Henry Kimpton, 1926. Pp. 250. Price, 21s. net.

THIS excellent work forms a companion volume to the authors' "Descriptive Atlas of Radiographs of the Bones and Joints." It is written for the student and general practitioner and by them will be found of the greatest utility. It is with pleasure that we note the inclusion of the more modern developments in diagnostic radiology. Such procedures as cystography and pyelography are now matters of routine. We note that the authors still mention the use of sodium bromide in this connection, whereas the modern technique consists of injecting diluted lipiodol. The injection of this substance is mentioned in connection with its use intrathecally. Cholecystography, or gall-bladder visualization by the Graham method (injection intravenously or ingestion orally in specially coated capsules of sodium tetraiodo-phenol-phthalein) is also mentioned, but it should have been stressed that this method has revolutionised the radiological study of the gall-bladder. Adequate mention has been made with the aid of excellent pictures

to show the utility of skiagrams to the obstetrician and gynecologist.

The sections on the intestinal tract and chest are specially good, and are illustrated with excellent radiographs showing very typical conditions.

It is a pleasure to recommend this volume to both the student and general practitioner, as it both reviews our older knowledge of radiography and brings to light the more modern methods.

We have a few criticisms to make:—Whereas ventriculography (skiagraphy of the brain after draining off cerebro-spinal fluid) is prominently mentioned, the method of Carelli now done every day, of inflating the peritoneal cavity with oxygen to get better skiagrams of certain viscera, is not mentioned.

There are a few mistakes in numbering which will doubtless be corrected in subsequent editions.

EYE, EAR, NOSE AND THROAT MANUAL FOR NURSES.—By Roy H. Parkinson, M.D. St. Louis: The C. V. Mosby Co., 1925. Pp. 207. Illustrated. Price, \$2.25.

THE Eye, Ear, Nose and Throat Manual for Nurses by Dr. Roy H. Parkinson is a unique production since as far as one is aware there is no such book written for the exclusive use of nurses.

It is written in simple style and avoids all confusing technical terms and gives all such elementary knowledge in anatomy, pathology and treatment of the ordinary diseases to be met with in these regions as will make the work a very useful *vade mecum* for nurses.

A most useful chapter is the one on operating-room technique, indicating clearly the various steps of different operations and the instruments employed in each. The book should be the means of training many a nurse to intelligently co-operate with the surgeon under whom she works and should fill a great want in these days when the importance of team work is more and more felt.

A SYNOPSIS OF SPECIAL SUBJECTS.—By various authors. London: H. K. Lewis & Co., Ltd. Pp. viii plus 376. Price, 18s. net.

THIS book is an admirable little synopsis of the various special subjects it deals with. The aim is a modest one and is to supply the general practitioner with practical information which may be urgently and quickly required in the course of a busy round of visits. Indeed the amount of information it gives is very great and it is surprising how much has been put into the small compass of the work. The book, attractive as it is, could be improved considerably by the addition here and there of a coloured plate which would bring vividly before the eye the typical clinical appearances of the diseases described. Such coloured plates would be of the greatest value in helping in diagnosis, particularly in the sections on dermatology and ophthalmology. The authors are however to be congratulated on the production of a very useful book.

Annual Report.

THE ROCKEFELLER FOUNDATION. ANNUAL REPORT FOR 1924.

THE ground covered by this report is so enormous that it is scarcely capable of review. The most interesting part of it is the general review of the year by the President, Dr. George E. Vincent. The following abstracts from his general report summarise the year's activities:—

During the year 1924 the International Health Board, the China Medical Board, the Division of Medical Education, and the Division of Studies of the Rockefeller Foundation (1) underwrote to the amount of \$350,000 a plan for publishing an international abstract

journal of the biological sciences; (2) began issuing bulletins which report progress in medical education in many countries; (3) helped to spread internationally knowledge about medical equipment and teaching methods through surveys by staff members, commissions of scientists, visiting professors, and travelling fellows; (4) hastened developments in the medical schools of the universities of Oxford, Cambridge, Edinburgh, Wales, Montreal, McGill, San Paulo, Hongkong, and Siam, and of the American University at Beirut; (5) maintained a modern medical school and teaching hospital in Peking; (6) aided three other medical schools and seventeen hospitals in China; (7) helped to improve the teaching of physics, chemistry, and biology in two Chinese and nine foreign institutions in China and in the Government University in Siam; (8) had a part in the development of professional training for sanitarians and hygienists at Harvard University and in schools and institutes in London, Prague, Warsaw, and San Paulo; (9) gave funds for nursing education at Yale University and in schools and hospitals in Brazil, France, Yugoslavia, Poland, and the Philippines; (10) kept a mobile staff on guard against yellow fever in Mexico and Central America; (11) at the request of Brazil joined in an attack upon this disease from eleven centres along the northern coast; (12) helped to show the possibilities of malaria control in thirteen American states and made malaria surveys or studies in Haiti, Porto Rico, Nicaragua, Brazil, Italy, Palestine, Queensland, and the Philippines; (13) either continued or began antihookworm work in conjunction with thirty-two states and countries in the West Indies, Central America and Mexico, South America, Europe, and the Far East; (14) contributed to the budgets of rural health services in 207 countries, in twenty-four American states and in New Brunswick, Brazil, France, and Czechoslovakia; (15) continued to aid the epidemiological intelligence service of the Health Section of the League of Nations; (16) contributed to the League of Nations's international study tours or interchanges for ninety-nine health officers from twenty countries; (17) provided directly or indirectly fellowships for 864 individuals of thirty-three different nations; (18) lent staff members and made minor gifts to many governments and institutions for various kinds of counsel and aid; (19) assisted mental hygiene projects both in the United States and in Canada, demonstrations in dispensary development in New York city, the growth of antituberculosis work in France, and other undertakings in public health, medical education, and allied fields.

Guiding Principles and Policy.

The trustees of the Rockefeller Foundation administer a fund which represents a *per capita* fund of \$1.50 for the people of the United States. The income if raised by popular subscription would call for a fraction over seven cents annually per head. Looked at in another way, the funds of the Foundation, measured by government expenditures, hospital support, or annual gifts for charity, are dwarfed into relative unimportance. Distribution to a large number of good causes might easily do little more than replace for a short time gifts from other sources. Concentration for considerable periods upon vital activities in limited fields seems to be the only way of doing anything worth while and lasting. For the present effort is centred on public health and medical education, but the trustees keep steadily in mind the possibility that in time other things may also offer opportunities. Concentration in any field is not interpreted as permanent or rigid.

The Foundation seeks direct relations with responsible agencies which are charged with carrying on a given work for the future. This means of course that nothing is undertaken until a careful first-hand study has been made by representatives of the Foundation. Thus when field demonstrations of disease control are made, the International Health Board deals only with government agencies. So, too, plans for medical school development are carried out in conjunction with perman-

ently established universities. Moreover, the Foundation expects governments and universities from the outset of a common undertaking to make a contribution in money or its equivalent in facilities or services. That is, aid is conditioned upon a substantial contribution from other sources. Again, help is given only for demonstrations of innovation and improvement. The Foundation takes no interest in the merely quantitative expansion of routine activities. There must be promise of qualitative advance in a given piece of scientific, administrative, or educational work.

There is another guiding principle of the Foundation. It withdraws entirely from a project as soon as this has become self-directing. The international Health Board . . . bring its part in a demonstration of hookworm or malaria control or of county health work to an end within a short and limited period. The Board's share of the cost steadily grows less as the government takes over more and more of the burden. As soon as the university or government has complied with the conditions the Foundation pays its share and has no further responsibility. It scrupulously refrains from all intervention in the administration of the institution.

The foregoing strictly applies only to major undertakings. The Foundation is ready, on request, to lend expert service or give minor kinds of emergency or other aid unconditionally to health departments, medical schools, institutes of hygiene, and a few nurse-training centres when this is feasible. Even in such instances increase of public funds and of private gifts are likely to be hastened.

Broadcasting the Progress of Research.

The output of scientific books and articles is enormous. It has been estimated that there are to-day in the field of medicine alone 1,500 journals which print about 100,000 papers annually. The *Index Medicus* with its 1,000 pages reports about 40,000 articles each year. The Surgeon-General's library in Washington has catalogued since 1880, 1,400,000 articles and 330,000 book titles. The task of sifting, listing, indexing, and in many cases making brief abstracts of scientific articles has become almost overwhelming. It is reported that 129 bibliographical reviews and 153 serial publications print abstracts or summaries. *Chemical Abstracts* alone condenses each year into 5,000 pages the substance of 100,000 pages of original articles.

A plan for creating, possibly in Geneva, a world centre of bibliography and summarizing from which international catalogues, indexes, and abstract journals would be distributed to the scientific workers of all countries makes a certain appeal to the imagination. But language difficulties, the location of great libraries in different capitals, the vested interests of existing journals, and national rivalries and ambitions make such a scheme for the present at least seem almost Utopian.

Eighteen societies of biologists in the United States have combined to found and maintain on an international scale an abstract journal of the biological sciences. This is a field in which such service is sorely needed. It is said that 40,000 articles in various divisions of biology are published annually. Representatives who have visited European countries believe that the chances of bringing about consolidation or at any rate exchanges of material with certain biological abstract journals are excellent. The Rockefeller Foundation through its Division of Studies has pledged the sum of \$350,000 toward a ten-year period of test and demonstration. It is expected that the Concilium Bibliographicum (an indexing and abstracting agency) of Zurich, to which the Foundation has been making a small annual gift, will be incorporated in the new project. The emergency distribution of medical literature in Europe is an effort to restore scientific communications which were interrupted by the war.

Distribution of Facts About Medical Education.

For three years the Foundation has been trying to complete an accurate list of the medical schools of all

countries. A revised list, still defective, based upon government reports, correspondence, special surveys, and staff visits, was issued during 1924. The total number of schools in sixty-nine different nations is 456. One reason for gathering these facts was to have a mailing list to which from time to time information about medical education in different countries could be addressed. While a good deal is published on this subject the articles appear in a great variety of scattered periodicals and reports. There is no international journal which specializes in the problems of buildings, equipment, organization, courses of study, methods of instruction, and other features of modern training in the science and art of medicine.

The Division of Medical Education has no idea of setting up a formal periodical in this field but it has planned a series of bulletins to be issued from time to time as accumulated material seems to warrant.

Hastening the Development of Medical Schools.

During 1924 several contingent arrangements with medical schools were in process of fulfilment. Payments were made to the University of Edinburgh toward the endowment of a chair of surgery, to the University of Wales for the development of the department of medicine at Cardiff, to Oxford University for the proper housing and support of biochemistry, to McGill University, Montreal, for the endowment of a university chair of medicine, to the University of Hongkong for endowment of a chair of obstetrics, and to the University of Montreal for the continued support of pre-medical teaching. A request from the University of Copenhagen to assist in bringing together in a new laboratory five departments of physiology which are now scattered widely in the city of Copenhagen, led to the promise of a substantial sum for this purpose.

Plans for the reorganization and staffing of the Siamese Government Medical School in Bangkok made steady progress. The King Edward VII Medical School in Singapore reported favourable action by Government on the Foundation's contingent offer to endow lectureships in laboratory sciences. Special emergency assistance was offered to the American University at Beirut to strengthen its medical school for a five-year period during which permanent endowment for the whole institution will be sought.

Medical Progress in Peking.

Peking Union Medical College is a modern medical centre in the capital of China, an outpost of teaching and research in the Far East. It includes a medical school for both undergraduate and graduate students, a teaching hospital, a school of nursing, and a pre-medical department. Because co-operative with an existing institution, governmental or private, did not seem feasible, the Foundation through its China Medical Board took over a school that had been started under missionary auspices. It created a new board of trustees, built, manned, and is now supporting the expanded and re-organised College.

The members of the medical faculty and their assistants number 79, of whom 41 are foreigners and 38 Chinese. The teachers are graduates of 40 medical schools and represent 9 different countries. It is the fixed policy of the College to recruit its staff so far as possible from Chinese sources. A large percentage of the lower positions are filled by Chinese appointees, from whom it is hoped to select men and women for higher posts. Already three Chinese doctors have been advanced to the rank of associate professor. One is in charge of a department.

The Peking Union Medical College has no desire to be an independent centre of foreign influence in China. It seeks to serve the best interests of the Chinese people, in harmony with national purposes and ideals. Before the College was reorganized and expanded the authorities of the central government were consulted about the proposals of the Rockefeller Foundation for medical work in China. They gave hearty approval. At the

formal opening in 1921 the President was officially presented and cabinet ministers cordially welcomed the institution as a prized agency of education. It is regularly registered with the Ministry of Education in Peking as an officially approved medical school of university grade. The trustees hope that the time will come when the College and Hospital may be put under Chinese control and made an organic part of the Chinese system of education.

In October, 1924, the students numbered 208 and were distributed as follows: medical school 62; school of nursing 20, premedical school 60, graduate and special students 66. The graduate registration was incomplete. During the year 1923-1924, 113 doctors and nurses, Chinese and foreign, did graduate work either in regular courses extending over several months or in short intensive courses especially designed for missionary doctors and others who cannot leave their posts for long periods.

In one respect the Peking Union Medical College is unique. Its staff members devote all their time to the service of the institution. They do not engage in private practice. In consequence the faculty has developed a spirit of team-work which at once strikes the visitor from abroad. A considerable amount of excellent investigative work is done each year. Cautious experiments in changing the order of studies and methods of teaching are being carried out. Careful tests of student capacity and accomplishment are being applied. In this environment undergraduates and young doctors find exceptional opportunities for technical training and for developing a spirit of comradeship in science.

Obviously the College must seek close relations with Chinese education and the life of the people. The China Medical Board is aiding premedical education in eleven institutions, both Chinese and foreign, by grants toward buildings, equipment, and current maintenance, by providing the services of experts in science teaching and by supporting a summer institute which in 1924 was attended by 130 teachers of physics, chemistry, and biology, who represented eighty-six Chinese and foreign schools and colleges.

The Doctor of the Future a Health Counsellor.

Probably three-quarters of all doctors to-day are general practitioners, i.e., physicians whose aim it is to recognise diseases, to deal with all the more common maladies by advice and treatment, and to know when to refer patients to specialists. This general practitioner is at present facing many difficulties. The specialist tends to monopolize prestige and to receive relatively much larger fees. Laboratory and hospital facilities which the modern doctor ought to have are expensive and often inaccessible. Sanitation and preventive medicine are restricting and even eliminating diseases like typhoid and malaria which once afforded a good deal of practice. Free and pay clinics, school and industrial medical services, health insurance (under government auspices in Germany and England), hospital associations and all efforts to spread costs of sickness over large population groups, and other forms of social medicine tend to encroach upon what was once the exclusive field of the general practitioner. There are people who assert that this type of physician is doomed that he will disappear because he cannot compete with the specialist on the one hand and with preventive and social medicine on the other.

Such an outcome is to be viewed with concern. The well-trained, properly equipped, experienced general practitioner of ability, character, and personality is a fundamentally valuable person. He is a good diagnostician. He sees his patient as a whole. He knows his peculiarities and circumstances. He can decide when to refer him to a specialist and when to protect him against the very real danger which is threatened by a narrowly specialist point of view. He cheers and encourages, warns and commands. He is not only a physician but a friend and counsellor. The disappearance of the general practitioner would be a serious loss. The stimulating philosophy of individualism with its insist-

ence upon independence, initiative, and ambition seems to be embodied in the general practitioner.

He will survive only if he can win confidence and make a living. But he will have to meet the new conditions. He will have to submit to a measure of teamwork in the use of laboratories and other resources; he will be compelled to recognize the public demand for sharing costs of sickness and, most important of all, he must become a practitioner of preventive medicine, a counsellor of health, a man who can recognize and correct the minor but remediable physical and mental defects which are so common. This will mean an increasing preoccupation with the normal and a knowledge of the effects upon health of diet, exercise, mental attitudes, recreation, and family and social life. To train men and women for this reinterpreted and re-directed function the medical schools will be compelled radically to modify their aims and methods and to "permeate the curriculum with the preventive idea."

Preparation for Protecting the Public Health.

"Hygeia," says a well-known teacher of preventive medicine, "has long been the Cinderella of the medical family." In spite of the progress of public health work the medical schools have too generally neglected or slighted the preventive side of medicine. This has had an unfortunate result. The average physician fails to see as clearly as he should that he is a vital part of the public health organization, that he is expected to discover and to report communicable diseases, to instruct his patients, to support the local authorities, to help to create sound public opinion.

The successful teaching of hygiene to medical students will increase the number of well-trained persons who choose this field as a career, but no undergraduate course can fit men and women for specialized service in preventive medicine. This has become a recognized profession which demands appropriate training in the nature and causes of communicable diseases, methods of controlling them, sanitation, various aspects of hygiene, mental as well as physiological, vital statistics, sanitary laws, organization, and administration. Work in laboratories, library, and lecture rooms must be supplemented and applied by practical experience in the field.

To provide this varied and intensive training special graduate schools and institutes of hygiene have of late been newly created or expanded in the United States, Canada, England, in Europe and South America. In 1924 the Rockefeller Foundation, on the initiative of the International Health Board, made an additional gift of \$400,000 to Harvard University for its School of Public Health, granted an interim appropriation for expenses of the London School of Hygiene and Tropical Medicine while its new building is being constructed, continued payments toward the building of institutes of hygiene in Prague and Warsaw, contributed to the maintenance of an institute of hygiene in Sao Paulo, Brazil, and pledged \$650,000 to the University of Toronto for the expansion of its School of Hygiene and Public Health.

Other forms of aid to special preparation for public health work included:—maintenance of field training posts specializing in malaria, hookworm disease, and country health work in Alabama and Georgia for members of the staff of the International Health Board and others, a contribution toward an experiment in correspondence teaching for health personnel in Ohio, and 159 fellowships to enable advanced students from twenty-three countries to gain additional preparation for specialized or administrative positions in official health services.

Smouldering Fires of Yellow Fever.

An outbreak of yellow fever in Salvador (seventy-five cases with twenty-two deaths) in the summer of 1924 was an unanticipated episode in a campaign which began in 1918 under the leadership of General Gorgas as head of a commission of the International Health Board. Control work had been carried on in Mexico and Central America, Ecuador, Peru, Colombia, Venezuela, and Brazil, with a reconnaissance on the Gold and Ivory Coasts of West Africa. No case of

the fever had been reported from Central America since 1921. It was hoped and believed that with the possible exception of a small focus of infection in Colombia the disease had been eliminated from the entire area which lies between the Rio Grande and the northern boundary of Brazil. This epidemic, however, taught its lessons. It showed the value of keeping a mobile staff of experts on call. Doctors on duty at other points were instructed by cable to go at once to Salvador to help the Government bring the outbreak under control. The promptness with which this was done proved that international organization against disease can be speedy and effective.

Brazil's Successful Control of Yellow Fever.

Oswaldo Cruz, soon after the method of combating yellow fever had been worked out in Cuba in 1901, freed Rio de Janeiro and southern Brazil of the disease, but measures for protecting the northern section were never carried through to complete success. In 1923 an invitation from the Government to the International Health Board to take part in a new and, it was hoped, final campaign in northern Brazil was accepted.

Dr. Noguchi of the Rockefeller Institute for Medical Research, the discoverer of the yellow fever germ, made a journey to Bahia where he demonstrated to a group of Brazilian doctors his delicate methods of detecting the elusive organism. He was able also to make further tests which confirmed the specific character of the germ. He was soon followed by a corps of men experienced in yellow fever work. In conjunction with federal and state health services eleven posts were set up in towns and cities along the coast from Victoria in the south to Manaus in the north. Large local staffs of inspectors and assistants were organized. From these centres, also, work in outlying areas was administered.

When work began in these eleven places yellow fever mosquitoes were found to be breeding in or near 80 per cent. of the houses in a city at one extreme of the list and in 22 per cent. of the habitations in the community at the other. Within a few months this had been reduced to 15 per cent. in the first city and to 5 to 1 per cent. in the others. It has been shown that when mosquitoes are breeding in only about 5 per cent. of the houses there is little or no danger that the disease will spread. The exact percentage for safety varies with the locality, the number of non-immunes, the climate, and the season. To be on the safe side the index, as this percentage is called, is reduced to the lowest point possible, often 1 or 2 per cent., and kept there in the key points for a year before the area is regarded as free.

Studies and Demonstrations in Malaria Control.

Malaria is a more difficult disease to control than yellow fever. Malaria control is by no means technically easy, except in the most favourable circumstances, and may not be economically feasible. In extreme cases malaria may and does make whole regions practically uninhabitable. In many parts of the world, for example, in large areas of the tropics, along the Italian coasts, in Macedonia and Greece, malaria is a dangerous, even deadly, foe. Several British colonies, the Panama Canal Administration, the Italian Government, and the United States Public Health Service, among others, have demonstrated the possibility of effecting varying degrees of control by large and small scale drainage, the oiling or Paris-greening of pools, the use of fish, the administration of quinine, the screening of houses, and so forth.

Since 1916 the International Health Board has contributed to demonstrations in malaria control, especially in towns and in countries which include urban and rural districts. During 1924 the Board aided thirteen states, twenty-three countries, and one town in the United States and maintained demonstration units in four Brazilian villages near Rio de Janeiro. In the three of these latter places in which work had been carried on for some time the decline in the number of cases was marked.

The Hookworm as an Advance Agent of Health.

In contrast with yellow fever and malaria, hookworm disease is a simple malady. The process by which tiny worms hatched in a warm and moist soil make their way through the skin of a human host and finally come to rest in the small intestine is well understood and can be clearly explained even to the most ignorant. The vermifuges which expel the parasites are simple and cheap. The building and use of sanitary latrines puts a stop to the pollution of the soil and protects the population against reinfection. To weaken the hold and bring under control a disease which robs of vitality, stunts, cripples, handicaps, and even kills millions throughout the hot and moist regions of the world is vitally important in itself. The International Health Board is an outgrowth of the original Rockefeller Sanitary Commission which was organized in 1909 to combat the disease in the Southern States. Since then the campaign has been extended to fifty-two countries in six continents and twenty-nine islands of the seas.

But the control of hookworm disease does more than give relief from one malady. It is an object lesson in public health. It shows a community what organized, concerted effort under trained leadership can accomplish. It is in a real sense an advance agent of preventive medicine, an educator of the public. The Board has purposely co-operated in the control of hookworm disease as a way of helping local and central governments to establish or extend their general health organizations. Thus in the United States, Brazil, Australia, and elsewhere hookworm units as such have been merged in regular health services.

Elsewhere hookworm measures are continued. In 1924 the Board assisted twenty-four states and countries from the West Indies to Siam, Java, and Ceylon to control the disease, and in eight countries made surveys to find out the extent of the hookworm problem. As usual, government appropriations were increased, while the Board's share diminished. Simple as hookworm disease seems, much is still to be learned about soil pollution, drugs, various effects of the disease according to age, sex, race, etc. So research went on in the Southern States of the United States and in other countries, notably China.

International Team-work in Health Service.

The gradual movement toward a closer world-wide team-work of these national systems is significant. The chief steps in this progress have been (1) the international sanitary conference in Paris in 1851 and 1859 to concert quarantine measures chiefly against cholera, typhus, and yellow fever; (2) the setting up in 1907 of the Office International d'Hygiene Publique in Paris to aid in carrying out continuously the provisions of an international convention concerning quarantine, in seeking uniformity in vital statistics, etc.; (3) the creation of the Pan American Sanitary Bureau; (4) the organization of the Health Section of the League of Nations; and (5) the reaching of working agreements between the League, the Office, and the Pan American Bureau.

The Health Section of the League gathers and distributes vital statistics, organizes international interchanges of health officers, seeks to improve methods of reporting births, deaths, and the presence of communicable diseases, aids in standardizing sera and vaccines, and renders many other forms of health service, e.g., special commissions on typhus and malaria. Since 1922 the Foundation, through the International Health Board, has been contributing toward the support of the epidemiological intelligence service and the health officer interchange of the League's Health Section. During 1924 the Board also agreed to aid for a five-year period an experiment in maintaining at Singapore a regional headquarters for the more prompt and accurate reporting of epidemic and other disease conditions in the Far East and administering a proposed maritime sanitary convention. The outlines of a co-ordinated world health service begin clearly to emerge.

Study Tours for Health Officials.

The League's plan for interchanges of health personnel deserves brief description. If international teamwork in preventive medicine is to be genuinely successful the men and women in charge in each country must have a vivid sense of the task as a whole, must have confidence in their colleagues across national borders, must be ready to learn from the experience of other countries, and must be magnanimous in putting their own knowledge at the disposal of all who may wish to profit by it. The printed page does a great deal but at best gives a blurred picture. Short international conferences and casual journeys abroad have value but may easily result in superficial, often misleading, impressions.

The interchanges of the League are something more than junkets of hygienists. They are genuine study tours or institutes. A group of health administrators and specialists from several countries assemble in the chief city of a given nation, listen to preliminary expositions, then in small sections spend considerable periods in the field inspecting institutions and work in progress. Finally the visitors reassemble for conference and discussion. Often more than one country will be studied in this way by the same interchange group. To point out in any detail the value of this plan in the diffusion of knowledge, increase of efficiency, and the fostering of a professional comradeship, would be to "elaborate the obvious."

Eight Hundred and Fifty Fellows from Thirty-Three Countries.

These Foundation fellowships are an organic part of the institution's policy; they are a means of carrying out plans in health and education, not an end in themselves. There is no hard and fast system of fellowships, no fixed apportionment to different countries no commitment for the future except to fulfil promises made to individuals. The Foundation does not publicly solicit applications, but selects, with the advice of governments and university departments, younger officials and graduate students of promise for whom positions of significance in their own countries are assured on the completion of professional studies abroad or at home. It cannot be too emphatically stated that it is no part of the Foundation's purpose to induce or make it easy for persons to settle permanently in countries other than their own. The aim is to prepare them for better service in their home lands.

During 1924, 864 individuals from thirty-three different countries received from the Rockefeller Foundation some form of fellowship stipend, either directly through a board or division or indirectly through an independent administrative agency.

Correspondence.

LITHOLAPAXY VERSUS LITHOTOMY.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to the article on suprapubic lithotomy by S. C. Das Gupta in your June 1926 number, it would seem that the writer does not favour the operation of litholapaxy.

In this connection I would draw the attention of your readers to an able article by Major-General Hooton, I.M.S., which was abstracted in the supplement to the *Indian Medical Gazette* for March 1926, (the *Indian Medical Year*, a review) and also in the *British Medical Journal* some time back. His chief argument in favour of litholapaxy was that the surest way of emptying a hospital was by avoiding crushing. I saw this happen when a surgeon carried out the suprapubic operation only and never did litholapaxy. Moreover the former operation means greater expenditure in keeping a patient for about two to three weeks in hospital, whereas it is a much more pleasing sight to see one's litholapaxy case

SEPT., 1926.]

sitting up in bed comfortably the evening of the day of his operation and leaving the hospital for his home, probably on the following morning.

One of the arguments advanced against litholapaxy, though not by the writer, is that the patient may have a recurrence, as a fragment may be left behind. This is possible perhaps, but unlikely if the litholapaxy has been done by an experienced operator. If the patient does develop a second stone, it is more than likely due to his having a "stone tendency." I have seen recurrence after suprapubic operations and in these operations nothing could have been left behind. In the *British Medical Journal* of February 1924—I am quoting from my notes—a case is described in which there was recurrence after three suprapubic operations in the same patient. These were performed in England. The writer advised the administration of saccharine tablets, one or two with each meal, which he said prevented the formation of phosphatic calculi, the urine being made acid. There was no recurrence in this patient after the third suprapubic operation and after the administration of saccharine. Crushing is of course not an easy operation and requires a lot of practice and a great deal of patience and perseverance, but when taught by and carried out under the eyes of an expert, one can become quite proficient, and as one gains experience one is able to tackle more difficult cases.

Litholapaxy is not an over-popular operation in England, but there the opportunities for crushing do not present themselves as often as in India, which may account for the trend of British opinion. I think however that litholapaxy, which is primarily an operation practised by Indian surgeons, is undoubtedly the ideal operation provided that there are no absolute contraindications.—Yours, etc.,

J. F. HENRIQUES, I.M. & S.,
Officer I/C. West Hospital, Rajkot.

July 1926.

Service Notes.

APPOINTMENTS AND TRANSFERS.

The undermentioned officers are placed on foreign service under the Indian Research Fund Association with effect from 1st March 1926.

Major H. E. Shortt, M.B., I.M.S.

Captain A. C. Craighead, I.M.S.

Lieutenant-Colonel R. McCarrison, C.I.E., M.D., I.M.S.

The undermentioned officers of the Medical Research Department are confirmed as Assistant Directors, Central Research Institute, Kasauli:—

1. Captain K. R. K. Iyengar, I.M.S.

2. Major J. A. Sinton, V.C., O.B.E., I.M.S.

Captain R. H. Malone, M.D., I.M.S., an officer of the Medical Research Department, is appointed to officiate as Assistant Director, Central Research Institute, Kasauli, with effect from the date on which he assumes charge of his duties on return from leave.

With reference to Army Department notification No. 962, dated the 23rd July 1926, Captain B. Sahai, I.M.S., is appointed to officiate as Executive Officer, Lahore Cantt. in addition to his ordinary duties with effect from 1st July 1926, vice Major A. A. F. C. H. Dawson granted leave.

The undermentioned gentleman to be temporary Lieutenant, subject to His Majesty's approval:—

Mohan Lal Ahuja, M.D. Dated 11th May 1926.

His Excellency the Viceroy and Governor-General has been pleased to make the following appointment on His Excellency's personal staff with effect from the 4th April 1926. To be Honorary Surgeon.

Lieutenant-Colonel F. F. Elwes, C.I.E., M.D., I.M.S.

Lieutenant-Colonel J. C. H. Leicester, M.D., F.R.C.P., V.H.S., I.M.S., Professor of Midwifery, Medical College, Calcutta, and Obstetric Physician and Surgeon to the

College Hospitals, is appointed to act as Principal, Medical College, Calcutta, and Superintendent of the College Hospitals, in addition to his own duties, with effect from the 23rd April 1926, during the absence on leave of Lieutenant-Colonel F. A. F. Barnardo, I.M.S.

Lieutenant-Colonel M. N. Chaudhuri, I.M.S., was appointed to officiate as Surgeon-General with the Government of Madras for the period from 27th March to 21st April 1926.

Major G. Covell, M.D., I.M.S., an officer of the Medical Research Department, is appointed to officiate as Assistant Director, Central Research Institute, Kasauli, with effect from the date on which he assumes charge of the duties of the appointment.

Major E. H. V. Hodge, I.M.S., Surgeon to His Excellency the Governor of Bengal, is appointed to act as Professor of Clinical Medicine, Medical College, Calcutta, and Second Physician to the College Hospitals, with effect from the 23rd April 1926, vice Lieutenant-Colonel D. McKay, I.M.S., granted leave.

The services of Major V. R. Mirajkar, F.R.C.S., I.M.S., are placed temporarily at the disposal of the Government of the Punjab, with effect from the 29th June 1926.

Major H. Hingston, I.M.S., officiating Professor of Clinical Medicine, Medical College, Calcutta, and Second Physician to the College Hospital, is appointed to act as Professor of Medicine and First Physician to the College Hospital, with effect from the 23rd April 1926, during the absence on leave of Lieutenant-Colonel F. A. F. Barnardo, I.M.S.

In modification of the Department of Education, Health and Land's notification No. 479-Health, dated the 27th March 1926, Major L. A. P. Anderson, I.M.S., is appointed substantively to the Medical Research Department with effect from the 1st April 1926.

PROMOTIONS.

Captains to be Majors.

Probodh Chandra Banerjee. Dated 2nd June 1926.

Amuj Nath Bose, M.B.E. Dated 8th June 1926.

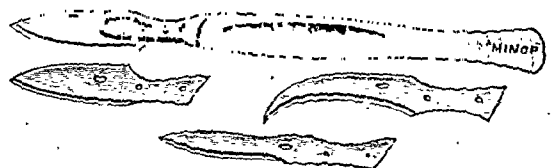
Madan Gopal Bhandari, M.B. Dated 14th June 1926.

Martin Melvin Cruickshank, B.Sc., M.D. Dated 28th June 1926.

NOTES.

THE "MINOP" SURGICAL KNIVES.

THE Holborn Surgical Instrument Co., 26, Thavies Inn, Holborn Circus, London, E. C. 1, are celebrated as an enterprising firm which turn out reliable and well-designed surgical instruments; and in this connection their "Minop" surgical knives should be ideal for the surgeon and medical practitioner. The knife is an adaptation of the principle of holding very sharp blades of different types in a special holder. The blades are interchangeable, fit on to two pins in the handle, and are securely held by a lever clamp. The blades are made of the finest cold rolled Sheffield steel; and a set of five types of blades is supplied, viz., scalpels, small, medium and large; Syme's knife and a Paget knife blade. The blades are sold separately in packets of half a dozen of each type. The handle costs 3s. 6d.; and an aseptic metal case to take one handle and six blades costs 4s.



We have had one of these "Minop" knives in use for a month, and they are ideal. They provide an absolutely keen cutting edge, can be sterilised with absolute certainty, whilst the compactness of the whole

outfit, giving the medical student in his dresser days, the medical practitioner or surgeon exactly what he wants for minor surgery in small compass, is admirable.

INTERNATIONAL CONGRESS OF SEXUOLOGY.

THE International Society of Sexuology ask us to announce that they will hold their first International Congress in Berlin from the 11th to the 15th October, 1926. A very large number of delegates from different countries is expected. Subjects to be discussed will be the sexual life in all its aspects,—social, economic and hygienic, medical and biological; sexual characters and types; judicial questions; the relationship of sex life to population, and the problem of declining birth rates; also the teaching of the young and physiological and psychological aspects of sex life. The Secretaries to the Congress are Dr. Moll, Berlin W., Kurfurstendamm 45; and Dr. Stutzin, Berlin W., Kurfurstendamm 44; to whom any enquiries should be addressed.

"PARIPAN."

THE chief essentials in hospital decoration are cleanliness, cheerfulness, cheapness, durability and ease of washing and disinfection, and in these respects the "Paripan" products have proved their value over many years of use. Hospital walls, ceilings, and woodwork can be so painted with these products that a hard, highly polished, washable and sanitary finish is given to all surfaces. A bacteriological report (for circulation among the medical profession and among architects only) from Guy's Hospital states that the surface of a coating with "Paripan glossy" appears perfectly smooth under the $\frac{2}{3}$ inch microscopic objective and that it is cleaned with exceptional ease. Emulsions of plague, cholera, typhoid and diphtheria bacilli were applied to such a surface and allowed to dry; it was subsequently found that, owing to the smoothness of the finish, a washing with water removed all the micro-organisms from the surface. Further, the "Paripan" surface was not affected by washing with 5 per cent. carbolic acid, 4 per cent. lysol, 1 : 500 perchloride of mercury, or formalin. In certain hospitals in the United Kingdom coats of "Paripan" applied from six to fifteen years ago are still as good as when originally applied. In one hospital where about 16 acres of wall surfaces were treated with these products, the application was still durable eleven years later, despite frequent washings and disinfections. The grand stand at the Calcutta race course is amongst other buildings which have been entirely painted with the "Paripan" process. The cost of painting is stated to work out at about 2d. per square yard per coat with "Paripan flat" and 2½d. per square yard per coat with "Paripan glossy." That the material will withstand tropical conditions is evident from certificates from executive engineers and others connected with the Ranchi European Mental Hospital, the Lady Hardinge Medical College at Delhi, the Pilgrim Hospital at Gaya, and other Indian institutions.

Among the different products prepared by the firm are "Paripan filler" for undercoating, "Paripan flat" which has a dull, matt surface, "Paripan glossy" with a highly glossy surface and "Sphinx enamel," a paint for everyday use. The Indian agents are Messrs. Ewing and Co., P. O. Box No. 73, Calcutta.

LISTER'S DIABETIC FLOUR.

THE diabetic has to-day a long list of prepared flours and foods from which to choose. One which has attained a very considerable popularity in America and in the United Kingdom is Lister's diabetic flour, which has been manufactured by the Lister Bros., Inc., of New York for the past eleven years. A recipe book prepared by the firm shews how large a variety of palatable foods can be prepared with this product, whilst each packet

contains the complete chemical formula of the preparation so that the medical man can be assured of what it contains. The Indian agents are Messrs. F. & O. Lang, 29, Strand Road, Calcutta.

MESSRS. HICKS' THERMOMETERS.

It is very important for the medical practitioner in the tropics to have reliable thermometers; and there are only too many on the Indian market which are absolutely untrustworthy. It is not at all unusual, indeed, to come across thermometers on the Indian market, sold at very cheap prices—most of them of Continental manufacture—which may be as much as 1.5° F. or 2° F. out.

Messrs. Hicks are perhaps the premier thermometer manufacturers in the world, and their clinical thermometers are absolutely reliable. The firm is one of very old standing, and every thermometer issued is tested on their premises by an expert before issue. With their thermometers the practitioner can be certain that he will not be misled as to the patient's real temperature. The agent for India is Mr. A. H. P. Jennings, Block E., Clive Buildings, Calcutta, who will be glad to forward a price list on application.

"BRAND'S ESSENCES."

BRAND'S essences need no introduction to the medical profession. For ninety years this celebrated firm has specialised in dietary products for the invalid and convalescent. Perhaps their best known product is "Brand's essence of chicken," a source of nourishment suitable for almost all cases of fever, gastric disturbance and dyspepsia of any type. For the Indian market this is specially manufactured under a different formula, and put up in tins marked as specially manufactured for use in India.

There are very many conditions of gastric disturbances when such a product, iced and sipped in teaspoonfuls, constitutes about the only form of nourishment that the patient can take. Messrs. Brand and Co. have a deservedly high reputation for their dietary products for invalids, and the attention of medical men in India may well be drawn to them. The agent for India is Mr. A. H. P. Jennings, Block E., Clive Buildings, Calcutta, who will supply price lists, etc., on application.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o The Calcutta School of Tropical Medicine, Central Avenue, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Annual Subscription to "The Indian Medical Gazette," Rs. 16 including postage, in India. Rs. 18 including postage, abroad.

Papers and articles forwarded for publication are understood to be offered to the *Indian Medical Gazette* alone, and any breach of this rule will be followed by non-publication.

The Editors of the *Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

Original Articles.

ENTERICA.

SOME NOTES ON THE VALUE OF MARRIS'S ATROPINE TEST IN DIAGNOSIS, AND OF T. A. B. VACCINE IN TREATMENT.

A résumé of 151 cases (1919-26).

By M. L. TRESTON, F.R.C.S. (Eng.).

MAJOR, I.M.S.,

General Hospital, Rangoon.

THE outstanding clinical diagnostic features of enterica, as given in Western text-books of medicine vary with the specific sub-group causative organism. In typhoid fever the main symptoms and signs are (a) onset insidious, (b) temperature curve characteristic, (c) slow pulse, (d) headache, (e) enlarged spleen and (f) rash. In comparison with typhoid, in the paratyphoid group, one looks for (a) a more rapid onset, (b) irregular temperature curve, (c) slow pulse, (d) enlarged spleen and (e) rash. Common to the group enterica, therefore, one gets (a) slow pulse, (b) enlarged spleen, (c) rash. In India and Burma it has been my experience that only one of these symptoms and signs is of any value, and that is a slow pulse. Nearly all cases are malarial subjects. In the cases under reference all had enlarged spleens, some 4 in. to 5 in. below the costal margin. Nor have I been able to detect a rash in any case of enterica which I have seen in orientals.

But a slow pulse is not pathognomonic of enterica in the East. It is found in many fevers,—notably dengue, sandfly fever and influenza. Other means of diagnosis must be employed if the fever is to be recognised early and these are:—

1. Blood culture—1st to 5th day.
2. Widal's reaction—5th to 9th day or later.
3. Marris's atropine test.

As this paper is mainly intended for practitioners who are too far away from a laboratory to permit of a blood culture or a Widal reaction being done, it is with reference to Marris's atropine test that I wish to give a few notes from my series of cases which may be of value. It may not be out of place to mention here that the presence of malarial parasites in the peripheral blood may tend to cloud the issue. Malarial parasites were found in 6 per cent. of the cases under reference, which, considering the constancy of enlarged spleen, is a very low figure.

Marris's atropine test, as quoted in the seventh edition of Manson's "Tropical Diseases" by Manson-Bahr, is applied as follows:—

"The patient lies horizontally, and is instructed to remain completely at rest throughout the test, which is not employed until at least one hour has elapsed since the last meal.

The pulse rate is counted, minute by minute, until it is steady. Ten minutes of such counting usually suffices. Atropine sulphate is then injected hypodermically in the dose of 1/33rd grain, preferably over the triceps region to ensure rapid absorption. An interval of 25 minutes is allowed to elapse, and the pulse is again counted minute by minute, until it is clear that any rise which may have followed the injection is allowed to pass off: 15 to 20 minutes may be necessary for this purpose, when the pulse rate is raised at the first count."

My experience with this test has led me to summarise it as follows:—

- (1) Count the pulse, minute by minute for 10 minutes.
- (2) Inject 1/33rd of a grain of atropine sulphate into the arm.
- (3) Wait 25 minutes.
- (4) Count the pulse, minute by minute for 20 minutes.
- (5) Take an average of Nos. 1 and 4.
- (6) If, after the injection of atropine, the pulse rate rises less than 14 beats per minute Marris's atropine test may be said to be positive.

The youngest patient on whom this test was done was aged 9 years, and the oldest 62 years. In no case did any untoward result occur after the injection.

Speaking of the diagnostic value of the test, Marris, quoted by Manson-Bahr, says:—

"In my own experience, which at any rate has been wide, the test is most serviceable. The test is serviceable, not only because of its unusual reliability, but for several other reasons. The method involves little or no expense. The tests are carried through quickly and yield their answers expeditiously. In these particulars the test fulfils the chief need of the clinician in dealing with suspect cases of typhoid; the test is especially competent under war conditions and with patients, who, almost without exception, have been previously inoculated, and in whom the disease and the serological reactions are in consequence profoundly modified. The test is standardized. The test is so simple that it may be applied successfully by assistants after a short period of instruction. In my personal conviction there is no test, clinical or pathological, which approaches the atropine test in speed, simplicity and reliability, for sorting inoculated persons, suspected of enteric, into two groups, 'enteric' or 'not enteric'."

To the evidence which is accumulating with reference to the above test, the results in my own series may be of value. In all, 103 cases were subjected to the Marris's atropine test. Subsequent clinical and pathological findings confirmed

these cases under the following categories. In addition controls were carried out in 20 cases.

1. Typhoid fever	..	47
2. Paratyphoid "A"	..	18
3. Paratyphoid "B"	..	8
4. Pulmonary tuberculosis	..	5
5. Influenza	..	19
6. Dengue fever	..	6
TOTAL		.. 103 cases.

The results of Marris's atropine test in this series of 103 cases may be summarised as follows:—

Disease.	Marris's test positive.	Marris's test negative.
1. Typhoid fever	.. 42	5
2. Paratyphoid "A"	.. 10	8
3. Paratyphoid "B"	.. 4	4
4. Pulmonary tuberculosis	.. 4	1
5. Influenza	.. 19	0
6. Dengue	.. 4	2

Thus the test in the enteric group gives a positive result in 56 cases out of 73, or roughly 77 per cent. The test therefore, may be said to be of distinct value, but it has no claim to infallibility. It was positive in a very high percentage of cases of typhoid fever, but not to the extent that it was positive in influenza,—a result which is worth bearing in mind. The figures, therefore, in my opinion, justify the following conclusions:—

(1) In typhoid fever, Marris's atropine test, taken in conjunction with the clinical manifestations of the diseases, is of definite value in the diagnosis of typhoid fever.

(2) The test is of relatively little value in the diagnosis of the paratyphoid group.

The second conclusion needs a little enlarging where Eastern medical practice is concerned. Cases of fever come into hospital late as a rule. This makes a clinical interpretation, between influenza and a partially observed case of paratyphoid fever a matter of extreme difficulty. In these cases the atropine test is not of value, as I found it positive in all cases of influenza. In private cases, seen early, the differential diagnosis was possible, apart from the atropine test, but only on clinical grounds.

For the last three years it has been my practice to deal with all fever cases as follows:—

1. On admission blood films are taken for malarial parasites.

2. Ten grains of quinine are given intramuscularly the same day.

If the blood film shows no malarial parasites, and if the quinine has no effect on the temperature,

3. Marris's atropine test.

4. A total and differential leucocyte count.

In no case of enterica under observation did the intramuscular injection of quinine lower the

temperature by more than 1° or 2° F., and it never brought the temperature down to normal. The value of the atropine test has already been outlined and the importance of a leucocyte count is too obvious to elaborate.

Leaving now the question of diagnosis, there comes the value of T. A. B. vaccine in the treatment of enterica. Here opinions are divided, and before giving the results in my cases I propose to review some of the literature on the subject. Stokes and Maldeis(1) record observations on about 100 cases treated with vaccine. Beginning with 50 million bacteria, and increasing to 100 million and 250 million, they found that the duration of the disease was shortened in a fair number of cases, and not a few showed a rapid fall of temperature to normal after several doses.

Sir William Leishman(2) gave it as his opinion that the general condition of patients was improved by vaccine treatment, though the duration of pyrexia was not curtailed, and also state that the incidence of severe complications was also less in those treated with vaccine.

K. D. Fairley(3) reports well on 8 cases treated with intravenous injections of typhoid and T. A. B. vaccines and maintains that vaccine therapy leads to a rapid termination of fever and diminution of toxæmia.

Mery and Girard(4) states that vaccine therapy is of value only if carried out within the first 10 or 12 days. After that it is valueless and may even cause a fatal issue. They also state that it is not a harmless procedure, and that it should be used with the greatest caution, especially in children.

Vigot(5) in contra-distinction to the above maintains that vaccine therapy is of great value irrespective of the stage of the disease or the severity of symptoms, and only quotes intestinal perforation as a contra-indication.

The points at issue would, therefore, seem to be:—

(1) Is T. A. B. vaccine of value in the treatment of enteric fevers?

(2) If it is,

(a) at what stage of the disease should be given?

(b) In what dosage?

Of my 151 cases all were given T. A. B. vaccine. The value of the vaccine may be placed under three headings:—

(i) Its effect on the death-rate.

(ii) Its effect on the fever.

(iii) Its effect on complications.

The figures for these cases

	No. of cases	Deaths.
(a) Effect on the death rate	151	5

Of these one died of pulmonary tuberculosis following enterica.

	No. of cases	Fever curtailed	No effect on fever.
(b) Effect on the fever	151	139	12

	No. of cases	Complications
(c) Effect on complications	151	11.

Of these cases 103 came in in-varying stages of the disease, and most of them after seven days or more of fever.

From these figures—which are not extensive—one may conclude that T. A. B. vaccine is of distinct value in the treatment of the enteric group of fevers.

At what stage of the disease should the T. A. B. vaccine be given? The following figures are illustrative:—

No. of cases.	1st week.	2nd week.	3rd week.
151	48	97	6

In other words the T. A. B. vaccine was given the moment the disease was diagnosed, and as most of the cases came in late, any day from the 8th to the 14th represented the usual time in the majority of cases.

In what doses should T. A. B. vaccine be given?

With fresh T. A. B. vaccine, i.e., vaccine less than a year old, the initial dose was m. ii, injected hypodermically. This was increased by one minim every alternate day to a maximum of 10 minims. The largest dose of fresh T. A. B. vaccine given was 6 minims. In 20 cases the increase was by two minims every four days. The effect was the same but these were picked cases.

With T. A. B. vaccine over a year old, and less than two years old, the initial dose was m. iii, increased by m. ii every alternate day. This will probably raise a point which has already been put forward, that the vaccine is not specific but is an instance of protein therapy and that any other vaccine would do equally well.

In the treatment of enterica with T. A. B. vaccine one dose was always given after the fever had dropped to normal.

SUMMARY.

The conclusions to be drawn from the above series of observations are as follows:—

- (1) Marris's atropine test is of distinct and definite value in the diagnosis of typhoid fever.
- (2) The atropine test is of little value in the diagnosis of the paratyphoid group of fevers.
- (3) T. A. B. vaccine in the treatment of enterica is of undoubted value. It curtails the pyrexia, limits toxæmia and prevents complications.
- (4) The vaccine may be given at any stage in the disease.

P.S.—It may be added that the T. A. B. vaccine used throughout was that issued by the Central Research Institute, Kasauli.

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LEPTOSPIROSIS.*

WITH SPECIAL REFERENCE TO THE EXISTENCE OF *SPIROCHÆTOSIS ICTERO-HÆMORRHAGICA*, OR WEIL'S DISEASE, IN THE ANDAMAN ISLANDS.

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I. Definition.

THE term "leptospirosis" means infection by that group of spirochaetes known as *Leptospiræ*. For many years there was much discussion as to whether spirochaetes should be classed among protozoa or among the non-protozoal bacteria. Many workers, basing their arguments mainly on Schaudinn's classical paper published in 1905 (i), claimed that they were protozoa: on the other hand, there is strong evidence that they are true bacteria, e.g.:—

- (1) Their nuclear structure is like that of a bacillus;
- (2) They divide by transverse fission,—as do bacteria but not protozoa;
- (3) Their rate of multiplication resembles that of bacteria more than that of protozoa;
- (4) Their serological and immunological reactions resemble those of bacterial, not protozoal, infections.

The many years of careful work carried out by the great authority Dobell may be said to have clinched the argument in favour of their bacterial nature.

II. Classification.

The classification of spirochaetes themselves is not an easy matter, but we may accept the following genera or groups:—

- (a) *Saprosira*; a big, free-living form with clearly-chambered structure;
- (b) *Cristispira*; i.e. a spirochaete with a crista, such as the one parasitic in oysters (*C. balbini*);
- (c) *Spirochaeta* (vel *Spirochaeta*), a genus which includes many groups and species parasitic in man, animals and birds. As important examples *S. recurrentis*, *vincenti* and *refringens* may be mentioned;
- (d) *Treponema*; not a true genus, but really a sub-genus. It includes the *T. pallidum* and *pertenue* of syphilis and yaws, and is characterised by its very minute size, and the smooth, even symmetry of its coils.
- (e) *Leptospira*; this, in addition to the usual spirochaete structure, has a spiral twist, like the strands of a rope, plus a special tendency to form hooks at one or both ends. (ii)

It is with this last group only that we propose to deal in this paper.

III. The Leptospiral group.

There are at present only three leptospiræ known:—*L. ictero-hæmorrhagica*, *icteroides* and *hebdomadis*. Morphologically these three are indistinguishable from each other; they are, however, differentiated by their serological and immunological reactions.

Before proceeding to discuss the diseases which they cause it is advisable to get a clear idea of the nature of the organisms themselves.

Morphology.—In appearance, then, they are minute curved rods, varying in length from 5μ to 20μ or more (usually $6-9\mu$), and 0.26μ in breadth. As already stated, they possess a secondary minute spiral superimposed on the larger coil, as though they were fine curved wires with a length of string tightly wound round them. At one or both ends is commonly seen a blunt hook; this may be on either the same or opposite sides, thus making a C or an S.

In the fresh state, leptospiræ are invisible by transmitted light under a microscope; it is therefore essential

* Being a thesis for the degree of M.D. (Cambridge).

to employ dark-ground illumination for their demonstration. By this method each minute coil appears as a dot, and the whole body suggests a row of refractive dots (like a chain of streptococci).

The leptospira is actively motile, but when it has formed the above mentioned loops at both ends it stops movement until one or both loops open out again. In a free space, it rotates constantly and seldom progresses in a semi-solid medium, it moves by a serpentine, boring motion, with the hooked end behind, but the minute elementary coils are not relaxed during this motion.

Leptospiræ can easily be cultivated on suitable media, and this is the best source from which to obtain them for the purpose of study. But they can also be isolated from the blood, urine, cerebro-spinal fluid, sputum and certain organs of the body, either of a patient infected with the disease or from an inoculated guinea-pig.

Their identification, however, is by no means easy, partly owing to their scantiness, and it is best, therefore, to concentrate them either by using thick blood films or by centrifugalising the urine, emulsion or other fluid containing them.

As regards staining methods, the following have been recommended:—

- (a) Leishman's or Giemsa's stains;
- (b) The Indian ink method;
- (c) The Congo red method;
- (d) Fontana's silver stain;
- (e) Harrison's Collargol method.

Personally, I have found the best to be Giemsa's diluted stain, the silver stains used by Fontana and Harrison, and the Indian ink method. Each has its drawbacks; the silver stains are not permanent, and—as Noguchi points out—Fontana's method shows up the leptospira as a coarse, wavy blunt rod without the elementary coils; the Indian ink method also is liable to cause minute cracks in the film which much resemble the transparent leptospiræ. The method adopted by Coles (iii) is perhaps the most satisfactory, and shows up the fine spirals clearly. He recommends making a thick emulsion of an infected kidney in a little saline solution; from this, very thin films are made on slides. When these films are quite dry, a few drops of distilled water, previously made slightly alkaline, are allowed to act for 30 seconds on the films, which are then stained in Giemsa's stain without fixation for 3-4 hours. By this method the fine spirals are easily seen.

By one or other of the above methods the leptospiræ may be detected and their morphology studied.

IV. Historical.

Though leptospiræ were first isolated and described little more than 10 years ago (i.e. in 1914), the diseases which they have been proved to cause have been known for a long time. These diseases are at present only three in number:—yellow fever, the seven-day fever of Japan, and spirochaetosis ictero-hæmorrhagica or Weil's disease, but there is every likelihood that dengue and sand-fly fever may soon be added to the list.

In past years, by far the most important of the three, on account of its widespread epidemics and high mortality has been yellow fever, and this is also the best known. It is said to have attacked the troops of Christopher Columbus in 1495 at St. Domingo, and to have been carried thence to America by them. It was not until 1625, however, that yellow fever was clearly described, as a clinical entity, by P. du Tertre, but its baleful effects on the sailors and troops in the many wars of that period quickly drew attention to the fact that it was conveyed from place to place by ships, and ineffectual attempts to control it by quarantine were made as early as 1709. The close connection of yellow fever with the prevalence of mosquitoes was first noted by Vaughan, in 1802, but it was not until 1881 that Finlay, of Havana, definitely attributed the spread of the disease to this insect. This opinion was quickly proved to be true (by Gerard, 1882; Reed, Carroll and others in 1900; by Agramonte, Cuiteras, Parker, etc. in 1903 and onwards), and the efforts of many research

workers became concentrated on the discovery of the infecting organism.

During the early years of the 20th century, many such organisms were described, e.g. the *Bacillus icteroides* of Sanarelli and the *Paraplasma flavigenum* of Seidelin, but in 1918 Noguchi, guided by the already discovered leptospira of Weil's disease, proved beyond doubt that yellow fever was caused by a similar spirochæte, the *L. icteroides*. This discovery was made while studying an epidemic in Guyana; he injected guinea-pigs with blood from patients suffering from yellow fever, and found that this resulted in a chain of symptoms comparable with yellow fever in man. Examination of the guinea-pigs' blood and smears of liver and kidneys, by dark-ground illumination, showed the presence of a delicate spirochæte resembling *L. ictero-hæmorrhagica* of Weil's disease. From these he was able to grow a pure culture of the organism on artificial media; to transmit it through a series of guinea-pigs, and subsequently to recover it in pure culture from their organs.

Weil's disease.—As mentioned above, the *L. icteroides* of yellow fever was not the first to be discovered; the pride of place belongs to *L. ictero-hæmorrhagica* of Weil's disease, first described by Inada, Ido and other Japanese workers in 1915. This was confirmed by Huebener and Reiter in Germany during the same year.

The history of Weil's disease is a long one, though it does not date back so far as yellow fever. But there is little doubt that this disease was prevalent in 1800 in Napoleon's army in Egypt, and it was also described in the American Civil War. The name, Weil's disease, commemorates the first clear description of the disease by Weil in 1886.

In modern times it occurred sporadically among our own and the enemy's troops on the French and Italian fronts. Outbreaks also occurred among the troops in Gallipoli and Salonika, and in Egypt where the disease was known to be already endemic. It is known, in fact to occur in most of the countries that border the Mediterranean. It has also been reported in Germany, the United States, Peru, Brazil and West Africa, and in the British Isles.

The third disease known to be caused by a leptospira is the *seven-day fever of Japan*. The *L. hebdomadis*, which is the cause of this disease, was isolated in 1918 by Ido, Ito and Wani. It should be noted at the outset that this disease should not be confounded with the seven-day fever of Indian ports, described by Rogers (iv): this is probably only a form of dengue, and, up to date, no causal organism has been isolated from such cases. The Japanese disease is a short fever which has been known for many years to occur epidemically during the summer months in that country.

V. (A). Characters of PROVED Leptospiral diseases.

The main subject of this paper being Weil's disease, I do not propose to go into detail in regard to the other two proved leptospiral diseases, except so far as is necessary for differential diagnosis.

(a) *Yellow fever*, then, is a disease caused by *Leptospira icteroides*. The organism may be recovered from the blood during the first three days of the fever, but it is scanty and difficult to find in blood-films. It is better, therefore, to inoculate a guinea-pig with blood taken during the infective stage, and then examine the guinea-pig's blood or organs. It is never found in the urine,—a point to remember when comparing yellow fever with Weil's disease. Yellow fever is a sea-coast disease, with endemic foci and epidemic extensions (now happily becoming rarer and rarer). It is transmitted by the mosquito, *Aedes aegypti*. A period of 12 days must elapse before a mosquito that has bitten a yellow fever case becomes infective; this is almost certainly to be explained by the developmental process of the organism in its host. The incubation period after infection is usually 4 to 13 days.

Clinically, yellow fever may be described as having:—(1) An *initial fever* stage, lasting 3-4 days, with sudden onset, frontal and orbital headache, photophobia, pains in the legs, loins and epigastrium, flushed face and dry

skin. The tongue has a white fur on the dorsum but the edges remain clean. (Cf. Weil's disease.)

The pulse, 100-120 at first, becomes comparatively slow in convalescence. This feature was first pointed out by Paget, and has therefore been named "Paget's Law." It holds good, generally, for all known leptospiral diseases, and may prove a useful guide-post leading us to the discovery of leptospiræ in other diseases.

Jaundice starts about the third day.

Albuminuria begins early, and steadily increases until the urine may go solid on boiling. The urine remains acid. Eruptions may occur, but are of no characteristic type.

Constipation is the rule at onset.

There may be delirium or torpor.

Vomiting is common, and the occurrence of "black vomit" is a classical and very serious symptom.

The blood shows either no leucocytosis or only a slight polymorphonuclear increase early. Later, there is leucopenia.

Death commonly ensues on the 5th or 6th day: if not—

(2) a period of calm sets in, lasting 5-7 days, and is followed by—

(3) a stage of reaction. In this the fever is not so high, but lasts longer. Jaundice is much deeper. Black vomit is common. The urine may be suppressed. Death may occur at this stage.

Relapses are very rare.

The usual duration of the illness is about 8 days, counting to convalescence or death. (Carter).

(B). Seven-day Fever of Japan.

As already mentioned, the disease caused by *Leptospira hebdomadis* is that which occurs in the dry regions of Japan during September or October. It is not, however, confined to Japan, cases having been recorded in Sumatra, Panama, the Sudan and elsewhere. In Japan, the normal host of the leptospira is the field-mouse (*Microtus montebelli*), and the endemic area of prevalence of the fever corresponds with the distribution of this mouse in that country.

The disease is characterised by sudden invasion, severe headache, muscular pains in the back and limbs, and pyrexia lasting 6-7 days, usually with a "saddle-back" curve and associated with a pulse which is relatively slow in relation to temperature. The eyes are congested, and there may even be conjunctivitis; lymphatic glands are enlarged; digestion is upset and the patient suffers from much depression. There is no rash in the Japanese cases, no jaundice and no relapse. The disease is really a mild one, compared with the other leptospiral diseases, and the mortality is nil.

Manson-Bahr, even in his latest edition of "Tropical Diseases," confuses it with the seven-day fever of Indian ports, and therefore his description is somewhat misleading. The seven-day fever which we see in India, and which is common in—but by no means limited to—Indian ports, is probably identical with dengue. Castellan and Megaw, among others, take this view (v and vi), and it is hardly credible that—if the Indian variety is the same as the Japanese—the *L. hebdomadis* should never have been found in the Indian cases. Clinically also, the Indian seven-day fever has more in common with dengue than with the Japanese fever, and though Rogers, in his original description of the Indian form, considers it distinct from dengue, Megaw has always been of the opinion that they are the same disease. The seven-day fever of Japan is never accompanied by a rash, whereas Rogers describes a mottled rash, resembling measles, as occurring in at least 7 per cent of his cases, and I have noted the same in my own case and in that of many of my patients.

The same applies to the type of the fever; in typical epidemics of dengue I have seen the "saddle-back" chart described by Rogers as characteristic of seven-day fever, interspersed with the more usual dengue type.

For instance, in one of the earliest epidemics of this nature to come under my notice,—in a Carnatic regiment at Trichinopoly in 1909—60 per cent. of the cases showed

this saddle-back type, and the fever lasted 6-7 days; in the remainder, there was no saddle-back curve and the duration of the fever was somewhat less (5-6 days).

Towards the end of this epidemic, my wife and I and another British officer simultaneously succumbed to the infection; all had the typical saddle-back type of seven-day fever, and two of the three had a well-marked rash which my notes describe as "like German measles."

None of the cases in this epidemic had any relapse, but in another similar epidemic the year before at Secunderabad a curious fact was noted by Leslie and myself, namely, a slight rise in temperature and a feeling of malaise in a fair proportion of the cases on, or about, the 21st day from the onset of the disease. I am unaware that this has ever been noted elsewhere, and this is natural, for it is seldom possible to keep patients under strict observation for so long after convalescence.

Compared with yellow fever (and Weil's disease), seven-day fever is very mild and never fatal. The fever does not last more than 7 days; jaundice is rare; there is only a trace of albumen in the urine—if any; no violent joint pains, no morbilliform eruption and no relapse.

The leptospiræ can be found scantily in the blood during the pyrexia, and appear in the urine after the 8th day, persisting therein sometimes till the 39th day.

The possibility of dengue (including the seven-day fever of India ports) and of sand-fly fever being leptospiral diseases has already been mentioned. Before proceeding to the third proved leptospiral disease, therefore, it is advisable to touch on these diseases, in order to show how they resemble or differ from the proved diseases, and also to state the evidence on which is based their proposed inclusion in leptospirosis.

V. (B). Characters of SUSPECTED leptospiral diseases.

Manson-Bahr, in his article on Phlebotomus fever, (vi) points out that "yellow fever, dengue and Phlebotomus fever have several points in common or, at all events, a similar origin—for instance, a leptospira, as in the first-named. Each is transmitted by an insect; their germs occur in the blood-stream and are filtrable; they are diseases of warm climates only," (though Weil's disease, another leptospiral disease, occurs sporadically in England); "and, clinically, they are characterised by a short incubation period and a brief and rapidly developed fever which is usually associated with a relatively slow pulse and leucopenia, and relative decrease in the polynuclears." He states elsewhere, (*ib.*, p. 173) that "Dengue is probably one of the most difficult diseases to differentiate from mild yellow fever." Col. Megaw (vii) also stresses the difficulty of differentiating between dengue and sand-fly fever, and suggests a new nomenclature, naming the disease after the vector, i.e. mosquito-dengue and sand-fly-dengue. As an instance of this difficulty, I might mention three distinct epidemics which have occurred in my practice, all of which show typical saddle-back temperatures lasting 7 days. The first was the above mentioned series at Trichinopoly; these were almost certainly due to *Aedes aegypti*; the second was a series at Port Blair, where both *Aedes* and *Phlebotomus* were abundant at the time. In these cases, with the terminal rise there was often a definite rash, which favours dengue. The nor did the Port Blair variety leave the distressing sequelæ for which typical dengue is noted. The third epidemic occurred among the prisoners of the Jail at Coimbatore in South India last year. In these cases, the fever averaged seven days in duration, but varied from three to ten days in some cases; it was usually saddle-back in type and the pains were severe, but the agency was almost certainly Phlebotomus. These insects were found to be numerous in the cells of that part of the Jail from which the cases were admitted, and the epidemic entirely ceased after these cells had been fumigated.

As regards laboratory evidence, Couvy (viii), investigating an epidemic of dengue which attacked practically the whole population of Beyrouth in 1921, found in the

blood short, slender spirochaetes having two or three turns and fine extremities. These were usually found two or three hours before the onset of the fever, but he also found them in the blood during the first 36 hours of the fever.

He also claims (ix) to have found spirochaetes in the blood of sand-fly fever cases, 3 hours and 24 hours after the onset of symptoms.

In 1922, Whittingham (x) isolated a leptospira as the causal agent of sand-fly fever, but the proof of this is not complete.

We have therefore these fevers—dengue (with which may be included the seven-day fever of Indian ports), and sand-fly fever—blending almost imperceptibly into one another as regards their symptoms and in which a leptospira has been reported as the causal agent. (For the "spirochaete" of Couvy morphologically resembles a leptospira.) Of these, dengue has been described as almost indistinguishable from a mild attack of yellow fever; and we now come to another leptospiral disease which is also so like yellow fever that the suggestion has been put forward more than once that they are one and the same disease. I may here quote the words of Dr. Ryle (xi), who in 1917 reported on the cases of Weil's disease on the Western front:—

"I well remember, when confronted with the first cases, turning to my volume of Osler for descriptions of infective febrile jaundice, and wondering whether yellow fever had perhaps arrived to add to the horrors of the Ypres front, (though the absence of *Stegomyia* from that neighbourhood made this improbable). Excepting that it is still more fatal, and that hæmatemesis, or 'black vomit,' is a more common accompaniment, the description of yellow fever would answer for that of spirochaetosis icterohæmorrhagica," for "clinically the two diseases are almost identical."

A. (c). *Spirochaetosis icterohæmorrhagica*. (Weil's disease or Infectious Jaundice).

Apart from Martin and Pettit's monograph (vii), Noguchi's article in Byam and Archibald's "Practice of Medicine in the Tropics" is perhaps the best description of this disease. This article, however, is probably based on his experience of the disease in Japan, where the symptoms tend to be more severe, and the mortality higher, than in any other country save Egypt. It would be well, therefore, first to describe the typical disease, and then to study the varieties seen in other parts of the world, before discussing the fever—found in the Andaman Islands—which has been called by many names in the past but which I consider to be nothing less than Weil's disease.

The typical disease. Weil's disease, then, may be defined as "an acute, non-contagious disease caused by the invasion of a special organism, *Leptospira icterohæmorrhagica* discovered by Inada and Ido in 1914. It is characterised by fever, jaundice, hæmorrhages and nephritis, and one attack usually confers complete and lasting immunity. The avenue of entrance of the organism is not known, but animal experiments have shown that it is capable of penetrating the intact skin as well as the mucous membrane of the alimentary tract." (Noguchi).

Geographical distribution: it is a widespread disease; it occurs in Japan, Africa and America; in Central Europe, South France and the Mediterranean area generally; numerous cases occurred on the Ypres front during the war, and isolated cases have been reported in England. It almost certainly exists in India, though—up to date—full proof of this is lacking.

It is liable to assume epidemic form in armies, where men are closely congregated and the conditions are favourable. Thus, it was very prevalent in 1800 in Napoleon's army in Egypt (xix), in the American Civil war and in the late Great War. In Japan it occurs in epidemic form amongst the miners in the wet coal mines; in Smyrna it has been endemic since 1837, and outbreaks have been noted in the more insanitary parts of Alexandria since 1870.

Epidemiology: The natural host of this leptospira is the rat, and the organism is excreted in its urine. In-

fection of man therefore probably occurs: (a) as a result of exposure of the human body to soil on which rats have recently urinated, or (b) from ingestion of food fouled by rats. In favour of this is the endemic infection of farmers and miners, and epidemic infection of troops in trenches. On the other hand, this may not be the whole explanation, for it was shown by Uhlenhuth and Zuelzer (xiii) in 1922, that there may exist in water (e.g. the tap water of Berlin) a leptospira which resembles *L. icterohæmorrhagica* both morphologically and in its virulence to guinea-pigs. They showed also that this water leptospira was not pathogenic to guinea-pigs until its virulence had been enhanced in culture media,—direct inoculation never giving rise to symptoms. The same may be the case with regard to man, a fact which may explain why Weil's disease is not more common. Some special condition must, perhaps, exist which enables the natural water-form of the organism to gain a footing in the human being. Its passage through rats might be one such condition, and it has been shown that passage through guinea-pigs greatly enhances its virulence.

There are, however, other factors which are not yet fully understood. One such is the *dose*. Inoculation experiments with water leptospiræ have shown that it is necessary to introduce a minimal number of organisms in order to produce infection (xiv). Another important factor is the *varying susceptibility* of the host. The inoculation of equal doses into a number of guinea-pigs produces very different effects, from no symptoms at all to fatal attacks of the disease. Human beings may differ equally in their susceptibility to infection, and this may perhaps explain the fact that most of the recent outbreaks of the disease in England have been confined to children or young adults. (xvii).

Since the work of Zuelzer, leptospiræ have been found to be widely distributed in nature. For instance, Coles (xv) found them in water at Bournemouth; Buchanán (xiv) found them in the slime on the roofs of coal mines in West Lothian; Korner (xvi) found them in the water of a bathing place at by arrested an epidemic among its . . . the Vesle outbreak of Weil's disease in Northern France was shown to be due to leptospiral organisms in the river mud and water (xvii). Still more recently, Hindle (xviii) has reported leptospiræ in the water taken from several parts of the Thames; in a tank at the Zoo; in a bowl of water in the laboratory of the London School of Tropical Medicine, and elsewhere.

Whereas Zuelzer's water leptospira required cultivation before it became pathogenic to guinea-pigs; this was not the case with Buchanán's, for the latter found that direct inoculation of leptospira-containing slime from the roof of the mine produced typical hæmorrhagic jaundice in guinea-pigs.

Seasonal prevalence. In Japan, cases occur from May to November, but the disease is specially prevalent in September to October (i.e. the same as for seven-day fever). In Europe, the cases occur in the hottest months.

In the Andamans, all my series of cases were in the dry season, i.e. from October to the end of January. The significance of this will be touched on later.

Symptomatology. The incubation period is 6-13 days, usually 6-8. The onset is generally sudden, chills ushering in a high fever, with headache and pains all over the body. The patient feels very ill and goes to bed at once.

General course. There is anorexia, severe headache, pains in the loins, intense myalgia of the back, neck and limbs, insomnia and great prostration. The patient lies flexed in bed. Nausea and vomiting are frequent. The fever, usually 103°-104° F. for the first two days, then drops to 100° or so, and lasts for 3-11 days. An early drop means either a mild or a very severe attack. There may be a secondary rise in the third week. The tongue becomes furred on the dorsum, but its edges and tip remain clean. There is an offensive odour from the mouth, sore throat and thirst.

The conjunctivæ become injected; a yellow colour appears on the 2nd or 3rd day, and reaches its maximum on the 4-6th day.

Hæmorrhages may occur in severe cases from the nose, ears, gums, stomach and bowel, and under the skin, before the appearance of jaundice. Epistaxis is common, especially in the Japanese cases (32.7 per cent.).

The urine is reduced in quantity, and usually contains albumen, bile and casts (hyaline, granular and epithelial). The pulse-rate does not correspond to the temperature curve; the blood-pressure is low and the cardiac weakness marked. English cases observe Faget's law (except the severe cases), but the Japanese cases do not. Nor do the cases in the Andamans. This difference may be explained by the comparative mildness of the first.

Blood picture. Red blood-corpuscles are usually reduced, sometimes by 50 per cent. But this reduction was not my experience in the Andamans. Hæmoglobin is reduced, 38 per cent., and the anæmia is persistent. There is marked leucocytosis, the polymorphonuclears being increased at first (90 per cent.) and the lymphocytes later.

Eruption. This is said to be present in 50 per cent. of Japanese cases. It appears in the second week, and lasts 2-5 days. It is usually morbilliform, but rarely roseolar or urticarial. It occurs particularly on the trunk, but also affects the limbs, especially wrists and knee-joints. Labial herpes is common, (45 per cent.), and is sometimes hæmorrhagic.

Jaundice is present in all save very mild cases, appearing on the 4th or 5th day. It first appears in the conjunctiva and becomes general just before or after the period of defervescence. Pruritus often accompanies it. Constipation, with pale brown stools, is usual in the jaundice cases. Hiccough is also often present during the jaundice. The liver is enlarged and tender (55 per cent. in the Japanese cases). The spleen is seldom palpable, a useful point of distinction from malaria.

Respiration is usually rapid, and in all severe cases there is acute bronchitis. Hæmoptysis or rusty sputum may also occur.

Lymphatic glands. Inguinal and axillary glands are swollen and sometimes tender to pressure. This is the case in 60 per cent. of Japanese cases. According to Bahr, those at the hilum of the liver are found, post mortem, to be specially enlarged.

Nervous System. There is intense headache, pain in the muscles of the entire body, but particularly in the calves and loins. Malaise, insomnia, hyperæsthesia, photophobia, dizziness, and in many cases delirium from 6th to 10th day.

Drowsiness and coma precede death, and the temperature may be sub-normal.

Pathology. Jaundice is usually intense, affecting the skin, conjunctivæ, deep tissues and viscera. Hæmorrhage is accompanied by congestion and by ecchymosis on the skin (67 per cent.), on most serosa and on the lining of gall-bladder, œsophagus, bladder, etc. It also occurs in the spleen, lungs and kidneys, and may be seen subcutaneously. The spleen shewed no enlargement in the Japanese cases, nor in those seen in France and England. But it is said to be enlarged in 75 per cent. of the German cases. In my Andaman cases the spleen was enlarged only when there was a definite history of malaria.

The liver is invariably enlarged, and yellow on section. There is moderate fatty degeneration, but it is not so marked as in yellow fever. There is no obstruction to the bile-ducts.

The kidneys are enlarged and icteric, with parenchymatous hyperæmia and hæmorrhages. The cortex shows cloudy swelling.

Nervous system: There may be hæmorrhages in the pia and dura mater and in the choroid plexus.

Respiratory: The pleural cavity may contain blood or ecchymoses, and the lungs show hypostatic congestion.

The above are the main pathological changes seen in moderately severe cases.

Diagnosis. From the above it will be seen that the main diagnostic symptoms of the disease are:—

Sudden high fever,

Relative tachycardia for temperature, (at any rate in the severer cases in Japan and the Andamans), severe headache, backache, intense myalgia of the entire body and great prostration.

Early conjunctival injection.

Jaundice.

Epistaxis or other hæmorrhages, eruption, constipation, nausea and vomiting.

Albuminuria and choluria.

To these should be added the laboratory aids to diagnosis, such as the acetic acid and Russo-methylene-blue tests*, the isolation of the organism and the serological and immunological reactions.

Prognosis. This seems to depend on the locality more than on anything else, as the following figures will show:—

Mortality in Japan, 11.7 to 48.0 per cent. according to locality.

Mortality in Egypt, 60 to 70 per cent. (Kartulis and Goldhorn).

Mortality in Andamans, 40.0 per cent. (Woolley).

Mortality in Europe, 4.5 per cent. (Dawson, Hume and Bedson).

Mortality in Ypres front, 5.4 per cent. (Ryle).

Mortality in Italian army, 2.0 per cent.

As mentioned earlier, a relative tachycardia is usually a bad sign. The disease usually causes great weakness and loss of flesh, and in non-fatal cases recovery is slow.

Treatment. The importance of absolute quiet and rest has been impressed on me by the cases that have come under my observation. Patients should not be allowed to walk for at least a fortnight after the onset of the illness, and preferably for three weeks. The heart is gravely affected by the toxin of the disease, and sudden heart-failure may easily be brought on by exertion.

To counteract the acidosis in the graver cases Ryle recommends giving alkalis freely by mouth and rectum, and my cases certainly did better after the adoption of this treatment. The question of diet, also, is important; the patient should be kept on liquid food, mainly skimmed milk, glucose and alkaline drinks. Fats should be avoided, and a return to solids begun very cautiously. I have found nothing of any use against hæmorrhages. Salvarsan preparations—in contrast to their specific effect in spirochaetal diseases such as syphilis and yaws, and against the *Spirillum minus* of rat-bite fever—are said (by Noguchi, Ryle and others) to be useless, and Salvarsan itself proved of no avail, clinically, in the two cases in which I administered it.

For severe cases (500-1000 c.c. plus adrenalin chloride) should be given, and Hexamine has given good results in some cases.

The most hopeful line of treatment, where available, is to give polyvalent anti-leptospiral serum intravenously (20 c.c. at a time) at intervals of several hours for at least four times in succession. This has been done in France (xii) and in Japan, but the serum was unobtainable for my cases, and I have no personal experience of its effects. It is said to be of no use in advanced cases with uræmic symptoms.

Another possible line of treatment is to inject the blood-serum of a patient convalescent from the disease. This is only possible when several cases occur in close succession. In the one case where I was able to adopt

* **Acetic acid test.** "The urine (of a case of Weil's disease) from the 5th to 8th day is said to give an intense green reaction when one or two drops of acetic acid are added to about 1 inch of the urine in a test-tube." (Bahr). This test was positive in Bahr's case (vide infra.).

Russo-methylene-blue test. Add 4 drops of a 1 per cent. watery solution of methylene blue to 4-5 c.c. of the patient's urine and mix thoroughly. Held against the light, the resulting mixture should show an emerald-green colour without a trace of blue in cases of Weil's fever. This reaction also occurs in cases of enteric

this method the patient recovered, but its value cannot be gauged without more experience.

WEIL'S DISEASE IN INDIA.

Whether or no this disease is actually existent in India has never been fully proved, though several small epidemics, clinically resembling it, have been reported from time to time. Attempts have also been made to isolate the leptospira, and its discovery has been reported more than once, but the complete proofs of its nature have not been obtained, and it is still uncertain whether the leptospira—even if found—was *icteroides*, *hebdomadis* or *ictero-hæmorrhagiae*.

A useful résumé of our knowledge in this respect was given by Glen Liston(xx), who refers to an epidemic of "infectious jaundice or Weil's disease" which had prevailed in Bombay in October, 1921. In this epidemic, spirochaetes, morphologically resembling leptospiræ, had been found in the urine of three cases, but they had not been differentiated. Other cases occurred at the same time at Deolali, in the Bombay Presidency.

Records show that a similar, but severe and widespread, epidemic visited Bombay in 1906(xxvii). Whether this was Weil's disease or not cannot now be proved; the clinical histories resemble the disease, but neither hæmorrhage nor albuminuria were prominent symptoms.

Milder epidemics have been reported by Franklin(xxviii) at Gilgit, and by Hodge at Samara.

Nevertheless, such records are few and far between, and my enquiries among practising civil surgeons and professors of medical colleges in India tend to show that cases of Weil's disease must be very rare in India. No case has been reported to me from Burma, Bengal, Madras, the Punjab or the Central Provinces. Major Knowles, Professor of Protozoology at the Calcutta School of Tropical Medicine, tells me that though he has been on the look-out for the leptospira for the past three years in India he has not yet found it. This by no means implies that it does not exist, for the leptospira is a difficult organism to find. (Noguchi found it in only 8 out of the first 74 guinea-pigs inoculated.)

It is evident, however, that there is a wide field for research in India in regard to leptospiral infections, and I feel confident that the definite discovery of *L. ictero-hæmorrhagiae* here is only a matter of time.

INCIDENCE IN THE ANDAMAN ISLANDS.

These islands lie in the Bay of Bengal, about 300 miles south of Rangoon and 900 due east of Madras. In reality they are the summits of a submerged range of hills between Burma and Sumatra. The group consists of five main islands, so closely adjoining each other that they have long been known as one, the Great Andaman Island. They extend along an axis of 156 miles, and have been known, and feared, for hundreds of years to the evil reputation of their

aborigines. In order to protect the crews of ships from these Negritos, a settlement was formed there in 1789, but it was subsequently given up. In 1857, however, as a result of the Indian mutiny, the Government required a place for prisoners, and it was decided to start a Convict Settlement in the Andamans. The position selected was a fine harbour, now called Port Blair, in the South Andaman Island, and this Settlement has been in existence ever since. (*vide map*.)

The population has throughout consisted of convicts, transported thither from all parts of India, Burma and Ceylon, and has naturally been a fluctuating one. The convict population has at times risen to over 14,000, but now numbers not more than 7,500. The free population, however, has risen to over 4,000. The aborigines, who at one time numbered over 2,000, are rapidly dying out, and may be neglected in considering the incidence of Weil's disease.

The climate of Port Blair is that of other tropical islands;—hot and damp, with an annual rainfall of about 110 inches. The islands are in the track of both monsoons, but usually get a dry season extending from the end of December to May, while October to December may also be free from rain.

History of the disease.—The first account of cases of jaundice and fever in the Settlement is by Chowdry(xxix), who reported a series of 588 cases which had been treated in Viper Island Hospital at Port Blair during the ten years from 1892. This series included all cases of jaundice, mild or severe, but in spite of that the mortality was 13.26 per cent.

In reading Chowdry's description of his cases one cannot fail to be struck by the similarity of the symptoms to a case of Weil's disease; the jaundice, intense pains in the loins and muscles, suffusion of the conjunctivæ, extreme prostration, nausea and vomiting, urgent thirst, albuminuria, a tendency to pneumonia, coma and subnormal temperature before death. The liver was always enlarged, but the spleen showed no enlargement unless there was also malaria. The motions were in most cases distinctly bile-stained and were "not so offensive in smell as is characteristic of the white jaundice-stools of India."

He also noticed the danger of sudden death especially if the patient got up, or even sat up in bed. Lastly, he mentions hiccough as a distressing and very unfavourable symptom. At autopsy, he found in many cases hæmorrhagic infarcts on the surface of the lungs, or clots in the bronchi. Infarcts were also seen in the kidneys, and the bowel was sometimes full of blood.

Chowdry was puzzled as to the cause of the disease, but attributed it to malaria. He, however, commented on the difficulty of understanding why, out of so many thousands of cases of malaria, only a few developed jaundice. He concluded:—"Whatever may be the real cause of the complaint, in the majority of cases it is

been noticed that they come from such occupations as necessitate sudden or constant and prolonged exposure to wet, viz., firewood cutting in the jungle, repairing embankments, working in the brickfields, cultivating and watching the paddy fields."

The two chief points in which his cases differed from the typical Weil's disease were that they did not occur in epidemic form and did not set in abruptly.

Nevertheless, as Glen Liston points out, the occupations recorded above are typically those which would lead to infection by *L. ictero-hæmorrhagicæ*, and epidemicity has been shown in England and elsewhere to be a non-essential feature.

My own attention was first drawn to the disease in 1911 by the sudden and tragic death of a Settlement Officer during my first tenure of the Civil Surgeoncy at Port Blair.

Major Woolley, who was at that time S. M. O., collected a series of cases, including 40 occurring in 1909, and published an account of them under the title "Malaria in the Andamans." (xxx) The symptoms of these cases were shortly as follows:—

Intense jaundice, with—occasionally and in the worst cases—a hæmorrhagic or petechial rash, and bleeding from the gums; (jaundice appeared on 3—4th day).

Fever, not necessarily high, for 2—3 days.

A very rapid and bad pulse.

Severe congestion of the conjunctivæ.

Albuminuria (sometimes) and choluria.

No enlargement of the spleen.

Delirium and insomnia. The latter was marked and very difficult to treat.

In the more favourable cases the jaundice would begin to clear up in 5 or 6 days, and the temperature might come down to normal. But the temperature was no real guide to the severity of the disease; the stools, which had been white, and the urine, which had been very dark during the jaundice, would return to normal, but the brunt of the disease seemed to fall on the circulatory system, and though the dangerously rapid and weak pulse might improve in volume at this time, it often remained unusually rapid, 115—120, for some days.

The prognosis was bad, 40 per cent. proving fatal.

I had the opportunity of seeing many of these cases and, though Woolley called them "malaria with jaundice," the evidence in favour of malaria always appeared to me to be weak. The spleen was not enlarged; the malarial parasite was never found in the blood during life nor in the deeper organs at autopsy, and Christophers found no evidence, in the specimens sent to him for examination, to support the view that the jaundice was due to malaria.

It is interesting, also, to note that Daniels (with whom Woolley corresponded on the subject) stated in his reply that the case-histories

reminded him far more of yellow fever: for Ryle, Liston and others have stressed the resemblance between this fever and Weil's disease.

As regards the ætiology of this series, Woolley bears out the previous statement of Chowdry, though he appears to have been unaware of the existence of that report. He says:—"The numerous creeks and swampy areas are bordered by mangrove swamps, and these swamps are uncovered by water at low tide... Convicts do not as a rule work among these swamps, but some of the Self-Supporter villages are very near them, and from these some of the severest cases are obtained.... They would appear to be instances of a very severe infection which even the seasoned Self-Supporter convict (who has spent years in the Andamans, and who may be regarded as almost immune to ordinary attacks of fever) is at times unable to resist.

The disease is almost entirely limited to these men, and the cases occur at a time when they work hard all day and at times late in the evening, standing knee-deep in water preparing their rice fields at a favourable time of year."

(Though the villagers worked in wet rice fields, and near the brackish swamps which were subsequently shown to be breeding places of the malaria-carrying anopheles *A. ludlowi*, it should be noted that their villages were, and are, usually situated on high and comparatively dry ground. The type of hut built is eminently suited to rat-infestation.)

In his subsequent report, Woolley states:—"These cases of fever with jaundice always come from the worst parts of the Western District in the south island.

These areas, moreover, are not disconnected but together make up one small area on the map. Until recently it was thought that only residents of villages bordering on the forest in the above mentioned area contracted the disease: but cases have lately occurred among labouring convicts, housed in barracks, and also two European adults living in the district have been attacked. The number of cases that are met with from year to year varies; during the past four years there have been 33 fatal cases, of which 17 occurred in 1909."

In this connection it is worth recording that the outbreak of 1909 followed an unusual period of drought. On the analogy of plague, such drought would be followed by great increase of rat-infestation, and therefore it is a point in favour of infection by *L. ictero-hæmorrhagicæ* through the medium of rats.

In 1912, Woolley and myself were both transferred from Port Blair, and no further records of such cases were kept. In 1920, on my return from active service, I was again posted to Port Blair, this time as S. M. O., but it was not until October 1921 that any more cases of jaundice with fever came to my notice. These were not so severe as the 1909 cases, and none were fatal.

They; however, were all characterised by the following main symptoms:—

Fever (2—3 days usually); intense jaundice; early congestion, and later jaundice of the conjunctivæ; very acute muscular pain, mainly in the thighs; hiccough; hæmorrhages and eosinophilia.

All these cases came from the villages of the western district.

In December of the following year (1922), 13 cases were admitted to the Viper Hospital, which is the main hospital of the western district. In these the fever lasted 7—10 days, but it was not high (up to 102°F.); jaundice was present in all cases; the conjunctivæ were injected and later jaundiced; the pains in the limbs, with cramps, were very acute; pulse and respiration unduly rapid; vomiting and hiccough present in some of the cases; headache and thirst very severe; prostration extreme and out of all proportion to the temperature and other symptoms.

The liver was enlarged in all cases; no change was noted in the size of the spleen; albumen was present in the urine in some cases only.

Again, in the cold weather of 1923-24, a further series of cases occurred, 11 patients being admitted from the villages of the same western district. The symptoms of these cases resembled the previous series, but two points are worth recording:—the special pains in the knees and the fact that the stools were white.

The mortality of these three series was 24 per cent. As already mentioned, all the cases came from the western district, from among the agricultural labouring convicts or Self-Supporters in the outlying villages or stations. This coincides with the previously expressed statements of Chowdry and Woolley.

Lastly, in September—October, 1924, 22 more cases came under my observation. Of these 4 died; one had rusty sputum during life and his lungs showed hæmorrhage and infarcts at autopsy; the second had blood and mucus in his stools, and the third died from cardiac failure. The fourth succumbed with high fever and a rash resembling erysipelas. The following are the salient features of this series:—

The cases occurred at approximately the same time of year as the former ones.

All the cases came from the same western district.

Fever and jaundice were present in all cases.

The jaundice appeared on the 5th—6th day, and the average duration was 19 days.

Severe headache was present in 17 out of the 22 cases.

Severe muscular pains in 20.

Prostration in 9, insomnia in 12, coma in 3 and fits in one case.

The tongue was always furred on the dorsum, but the tip and edges were clean and red.

Nausea and vomiting occurred in 50 per cent.

The stools were clay-coloured in 50 per cent. only.

Constipation was present in two-thirds of the cases.

The liver was enlarged in 15, and tender in 11 of the 22.

The spleen was palpable in 9, but most of these were definitely malarial.

Congestion of the fauces and throat was noted in 6.

The eruption was seen in 5 cases only; it should be remembered that in Indians eruptions are easily missed. Deafness occurred in three cases,—a symptom noted (as far as I am aware) only by Bahr.

There is no record of the percentage of cases in which hæmorrhage or glandular enlargement occurred, but this was low. Two of the fatal cases were probably hæmorrhagic.

This series was atypical in that albumen occurred in two cases only, though bile pigments and bile acids were present in the urine of almost all.

The case in which fits appeared was also unusual; the fits each lasted for over 48 hours and recurred several times. At last, (following the suggestion of Apert and Broca, xxvi), I drew off 10 c.c. of cerebro-spinal fluid, and injected half into a guinea-pig. Although the latter showed no signs of spirochætosis subsequently, the withdrawal of spinal fluid proved most beneficial to the patient, who had no more fits and passed at once from a moribund condition to one of convalescence.

Laboratory tests were carried out as fully as possible in these cases, and in three of them organisms, morphologically resembling leptospiræ, were found in stained specimens of centrifugalised urine. One of the fatal cases also showed similar organisms in smears from his liver. Guinea-pigs were also inoculated with the blood or centrifugalised urine of most of the patients, but none died with symptoms of the disease. In the stained kidney smears of one of them, similar leptospiral forms were seen. The lack of means to examine these cases by dark-ground illumination was most unfortunate, and the small laboratory was not sufficiently well equipped and staffed to carry out cultural experiments. Nor could supplies of anti-leptospiral serum be obtained, with which to carry out serological tests.

The proof, therefore, that the disease is in reality *spirochætosis ictero-hæmorrhagica*, or Weil's disease, is still incomplete. Nevertheless, enough has been said to show that there is a very strong probability of the existence of the disease in Port Blair.

CONCLUSIONS.

To sum up the features of the disease as we find it in the Andaman Islands:—

(1) The cases occur at a fairly definite time of the year, i.e., from the end of September to the following January.

(2) This season in the Andamans is one in which the land, made sodden by the long S. W.

CHART I.

LEPTOSPIRA ICTEROIDES (mild)
Disease Yellow Fever
Result in Recovery

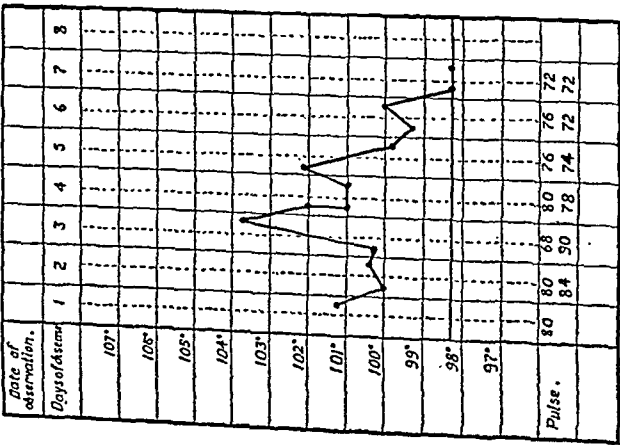


CHART II.

LEPTOSPIRA ICTEROIDES.

Disease Yellow fever

Hospital Cases quoted by Carter U. S. A.

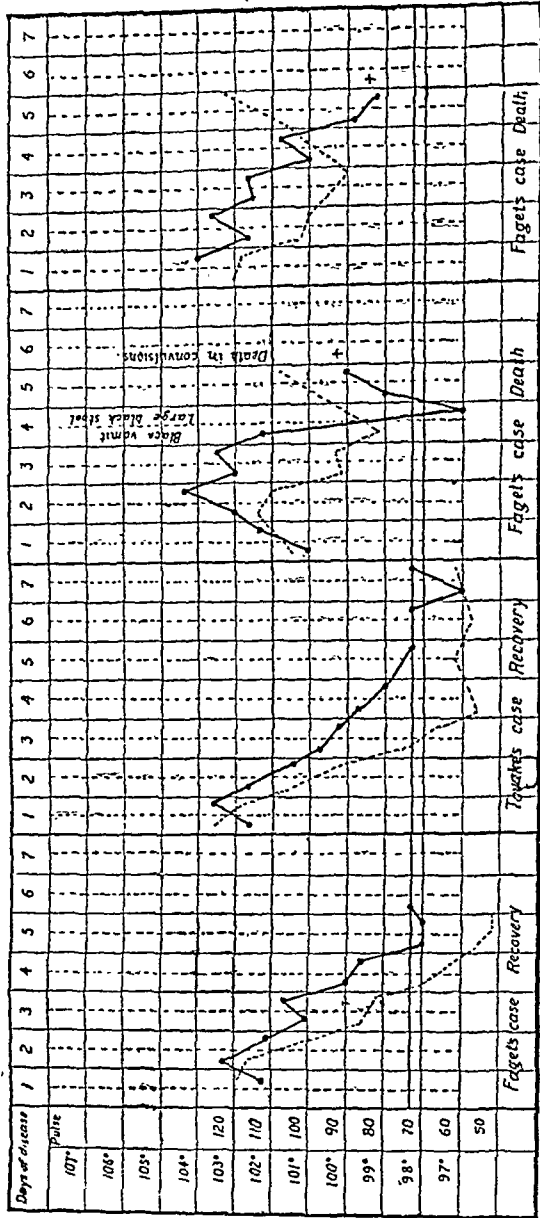


CHART IV.

LEPTOSPIRA ICTEROHAEMORRHAGICAE.

Result Death

Disease Hospital Wells disease.

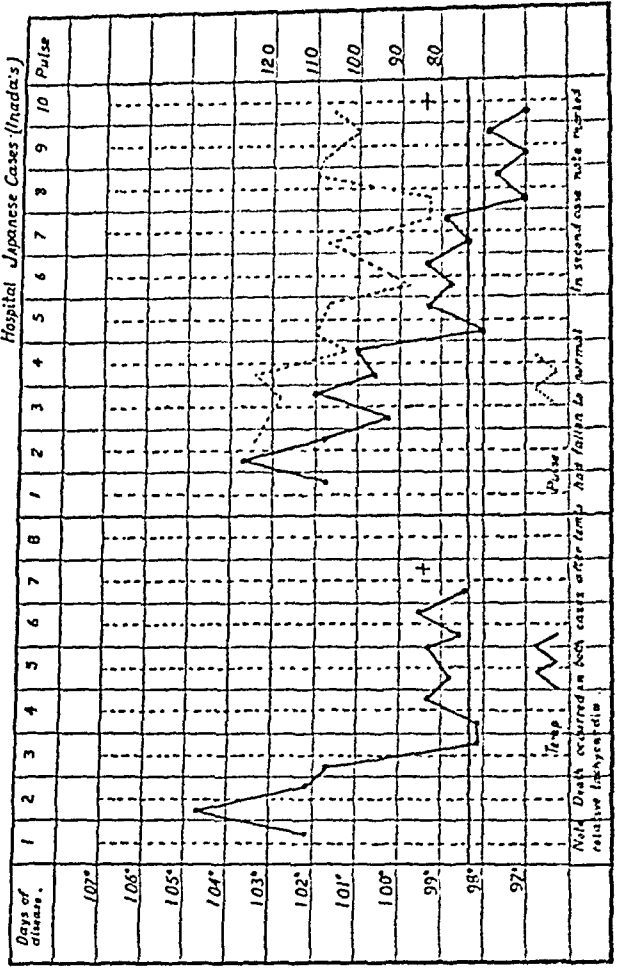


CHART III.

E.E.F. GASES.
Result atypical disease

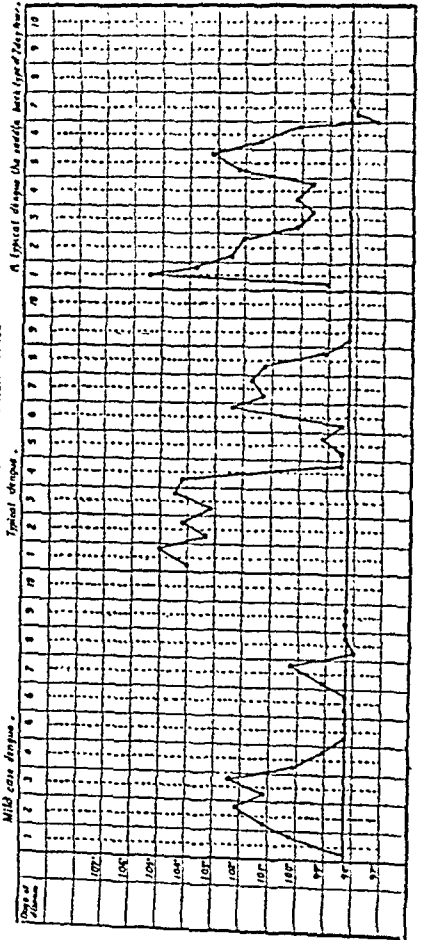


CHART V. LEPTOSPIRA ICTERHAEMORRHAGIC

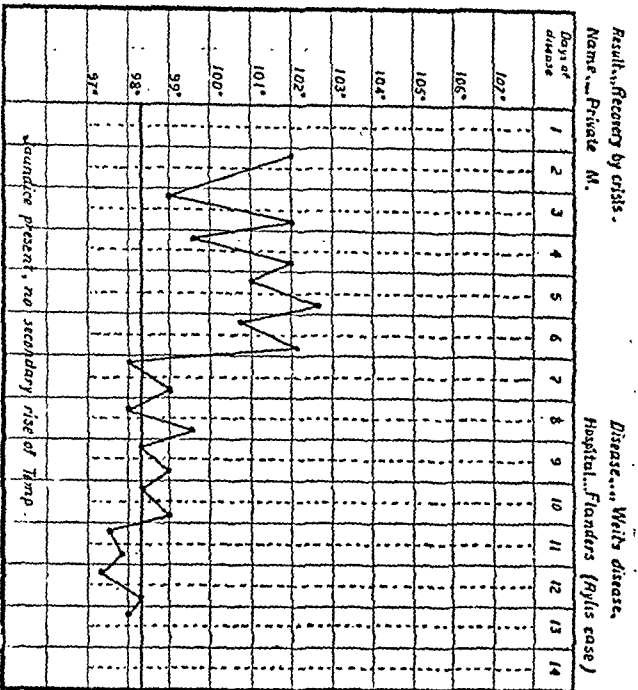


CHART VII.

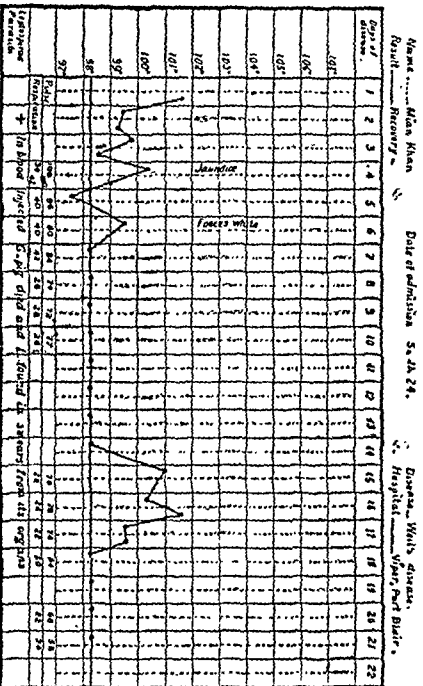


CHART VI.

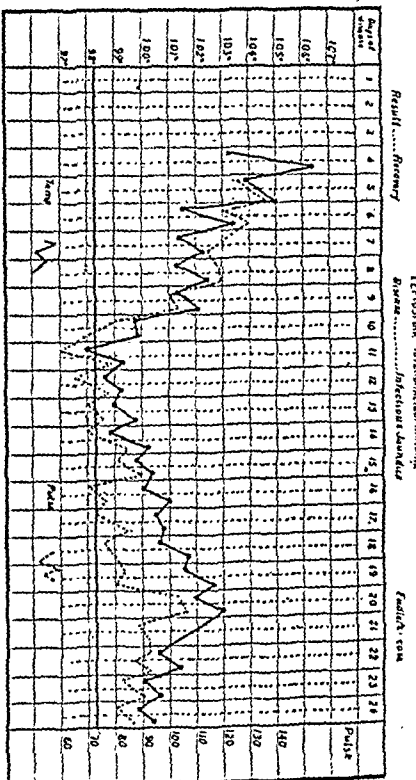
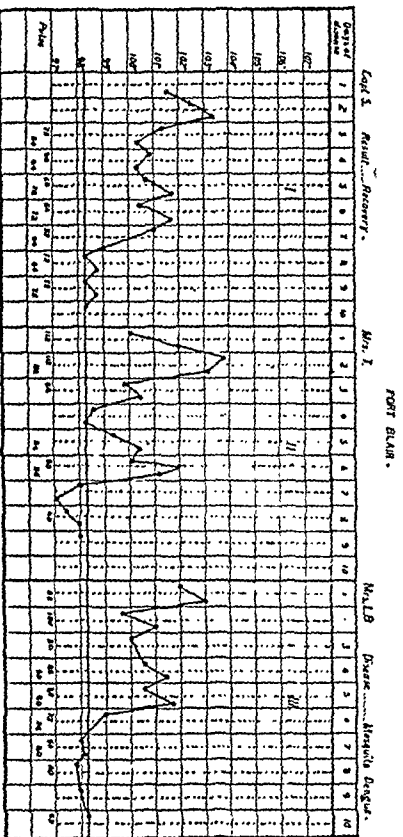
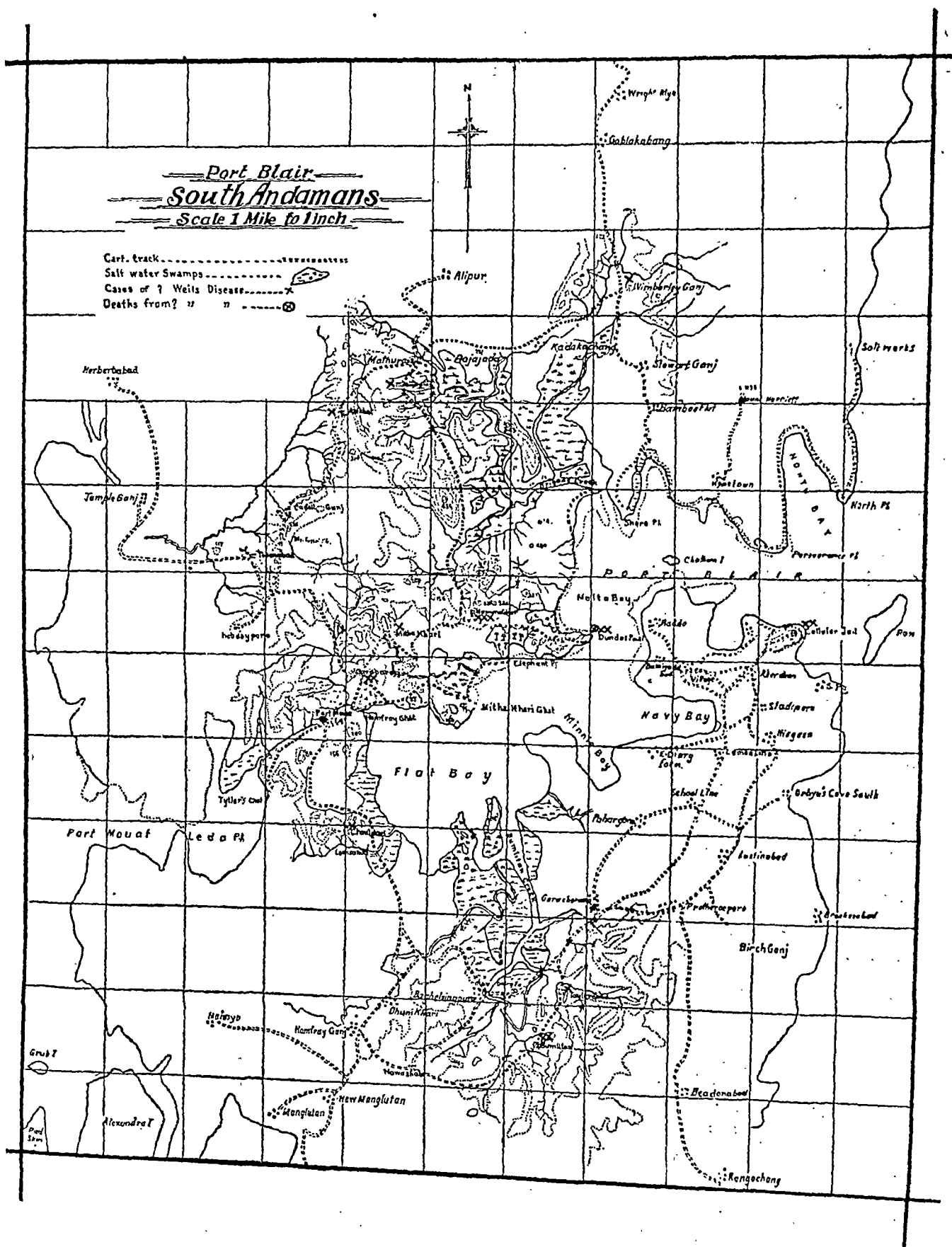


CHART VIII.





monsoon, is gradually drying up, and when the inhabitants are working all day in the still wet rice fields, or on swamp-reclamation work, with their bare feet and legs exposed to the possibility of absorption and infection by the leptospira.

(3) The disease appears to be limited to the western district only,—a district where the work is either agricultural or the draining of swamps or forests; it does not affect the older parts of the Settlement, where the land has been cleared and reclaimed for 20 years or more, and where the large bazars are situated.

(4) The occupations of those infected, and the character of the country where they reside and work, are typically those required for the development of *spirochaetosis ictero-haemorrhagica*.

(5) The symptomatology of the Port Blair disease, as detailed above, so clearly resembles the many descriptions of *spirochaetosis ictero-haemorrhagica* that it is almost impossible not to conclude that they must be one and the same disease.

(6) Apart from the greater severity of the symptoms, the mortality rate is too high for ordinary catarrhal jaundice, while the absence of parasites or splenic enlargement in my opinion excludes the possibility of malaria as the cause. Taking into consideration all diseases in which fever and jaundice are prominent symptoms, none can vie with *spirochaetosis ictero-haemorrhagica* in probability.

(7) The laboratory findings, as far as they have gone, also favour a leptospiral disease; but until further research has proved the existence of these organisms as the cause of the disease it is not possible to state definitely that *spirochaetosis ictero-haemorrhagica* is the true diagnosis.

As Glen Liston remarks, "epidemics of jaundice, associated with a considerable mortality, have occurred in India and the Andamans, but no person has yet proved that the leptospiræ found in these epidemics were *ictero-haemorrhagica* and not *icteroides*. With these facts before us, I would ask you to consider whether we have, or have not, yellow fever already present in India."

The above suggestion opens up a large question which is beyond the scope of this paper. Its importance, however, must be recognised, even though the evidence, in the case of the Andamans, does not appear to warrant the supposition, when the far greater likelihood of Weil's disease is taken into consideration.

We know that *L. ictero-haemorrhagica* can be excreted via the urine for as long as 100 days (xxx), and it is quite possible that convalescents or ambulant cases may act as carriers of the disease for a much longer period. Now that Port Blair is being converted into a free Settlement, communication between it and the ports of India and Burma will become far more frequent, and we must face the possibility of the transfer of the disease from the Andamans to places as yet free of this infection.

It is this factor, more than the actual sickness and mortality due to this disease in such an out-of-the-way spot, that renders further research work of importance; and it is a matter of regret to me that my transfer to India prevented me from completing the chain of evidence.

There is no finality, however, in the study of medicine, especially in the tropics, and I have every hope that the laboratory work initiated by me before my departure will in due course prove the undoubted existence of *Leptospira ictero-haemorrhagica* in the Andamans.

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OBSERVATIONS ON THE RESULTS OF TREATMENT IN 100 CASES OF CHOLERA.

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THE one hundred cases on which the report is based were treated by me at the isolation hospital of the Ludlow Jute Co., Ltd., at the village of Chengail on the bank of the Hooghly river in the district of Howrah. The period during which the cases were treated was from January 1920 to June 1926—about 6½ years. In 1920 there was a widespread outbreak of cholera in the surrounding villages and 54 cases were treated during that year alone. The Ludlow Jute Company had then only started the construction work for their future jute mills and the grounds were being reclaimed. The cases recorded were from among the coolies who at that time were housed in *hogla* huts in the different quarters of an area of 124 acres of low-lying marshy land, full of ditches and bordered by the Bengal-Nagpur Railway borrow pits.

As soon as an outbreak of cholera was noticed a sanitary inspector was especially engaged to search for the sick every morning and evening. This became an absolute and urgent necessity as certain sections of the labour population from Bilaspur and Orissa were very much afraid of bringing their comrades or relatives to hospital and would keep cases concealed by all means. It was found in some cases that a man with cholera would be left in a hut with a piece of "*hogla* mat" over the body and a second piece to lie upon. Economically it was very important to stop cholera outbreaks among the labouring classes because the itinerant gangs of coolies, especially from Bilaspur, Midnapur—chiefly engaged in doing the earth cutting work—would run away in a body as soon as one of them was dead from cholera.

For the first few days it was rather difficult for the sanitary staff to find out all the concealed sick persons but very soon they learned all the dodges practised by these coolies to avoid hospital and later on they became so efficient that it was possible to get cholera cases sent to hospital within a few hours of the attack. It was found that in the majority of cases the attack of cholera showed itself early in the morning. The coolie who had worked all day and eaten his supper was attacked between 10 p.m. and 4 a.m. with vomiting and diarrhoea and when detected in the morning he was in a collapsed state. This is the usual history of a case.

The usual drink was found to be tank, ditch or the river water. During the latter years with the sanitary improvements and supply of chlorinated drinking water cholera became a thing of the past on the premises of the Ludlow Jute Co., Ltd., although in the hospital we from time to time are called upon to treat cases of village coolies who contract the disease in their homes.

The treatment adopted in these 100 cases is known as Rogers' saline treatment, briefly consisting of hypertonic saline for intravenous injection in order to replace the lost salts, maintain blood pressure and help the elimination of toxins, giving a certain amount of alkaline salt solution (grs. 160 of sodii bicarb. to a pint of normal saline), using permanganates by the mouth to oxidise the bacterial toxins, controlling temperature in the reaction stage and keeping up the blood pressure and flow of urine and thereby avoiding uræmia.

The following tables show the results which have been obtained from this treatment:—

Year.	Cases treated.	Deaths.	Percentage.
1920	.. 54	13	24.04
1921	.. 15	3	33.3
1922	.. 7	0	0
1923	.. 4	0	0
1924	.. 7	0	0
1925	.. 10	1	10.0
1926	.. 3	0	0
	100	17	17.0%

STAGES OF CHOLERA ON ADMISSION.

Stages.	Number of cases.	Percentage.	Number of Deaths.	Death Percentage.
Preliminary diarrhoea	2	2%	0	0
Stages of copious evacuation	.. 30	30%	0	0
Collapsed	.. 67	67%	17	25.37%
Reaction	.. 1	1%	0	0

Thus by far the majority of cases were admitted in the collapsed stage and the mortality was 25.37 per cent. The two cases of preliminary diarrhoea were attending on their sick relatives in the cholera hospital and contracted the disease and were detected at once.

IMPORTANCE OF EARLY ADMISSION.

	Admitted within 1—12 hours.	Admitted within 12—24 hours.	Admitted after 24 hours.
Cases	.. 67	23	10
Deaths	.. 4*	7	6
Percentage	.. 6.1	32.6	60%

* One case was very toxic and died within a few hours of overpowering toxæmia.

One case resembled cholera sicca. The man, aged 22, was a guard on duty. He felt very ill only two hours before admission into hospital. He was on duty on a jute pile near the hospital. His comrades brought him to the hospital where he vomited once and was found to be in a collapsed state. The specific gravity of the blood was 1063 and the blood pressure slightly above 40 mm. of mercury. He died during the course of an intravenous saline injection. The abdomen was distended but no post-mortem was allowed by his fellowmen (high caste Brahmins).

One death took place from œdema of the lungs.

Thus it is clear that the earlier a case is admitted the better the chance of cure. Cases detected within the first 12 hours showed only a 6.1 per cent. mortality.

URÆMIC DEATHS.

In this series there were 7 deaths from uræmic complications.

Details of these cases were as follows:—

Serial Number.	Name, etc.	Admitted hrs. after onset.	Initial Sp. Gr. of blood.	Total quantity salines received.	Death in hrs. after admission.
1	Kelu, H. M., 35	14	1065	4	3
2	Lachar, H. M., 40	36	1066	3	2½
3	Bhui Samal, H. M., 40	48	1064	6	48
4	Hira, H. F., 30	48	1066	7½	24
5	Hare Krista, H. M., 35	24	1066	5	4
6	Ghana, H. M., 38	16	1062	7	48
7	Deoraj, H. M., 25	58	1063	4	72

Cases (1) and (2) were admitted in a moribund and comatose state from which it is never possible to bring back a cholera patient. Both of them died shortly after receiving the saline transfusion and it could not be said that the salines had any chance to alleviate the condition of advanced and extreme acidosis. They might as well be left out of the group of treated cases in which case the uræmic deaths are 5 per cent. The average number of days spent in the hospital was 3.71 per coolie.

RELATIONSHIP OF THE NUMBER OF TRANSFUSIONS TO SEVERITY OF THE ATTACKS AS MEASURED BY THE NUMBER OF DEATHS.

Number of Transfusions.	Average number of pints of saline.	Cases.	Deaths.	Percentage of deaths.
0	0	15*	0	0
1	2.51	54	9	16.6
2	5.63	15	4	26.6
3	7.14	7	4	57.1
5	12.5	1	0	0

* Two of these cases were in the stage of premonitory diarrhoea. These 15 cases did not require an intravenous transfusion and were given subcutaneous saline (2 cases) and rectal salines (13 cases) and permanganate by the mouth. They all recovered.

** The apparent increase in death percentage with increased number of transfusions is explained by the fact that the collapse was severe and relapsing and in the majority of these deaths uræmia played the fatal part. Thus in 8 deaths from the 2 and 3 injection groups 7 were uræmic deaths, leaving 1 death in 22 cases (i.e., 4.5 per cent.).

SUMMARY.

(i) 100 cases of cholera were treated in the Ludlow Jute Mills Co. Isolation Hospital during the years 1920-26. The treatment adopted was Rogers' saline treatment.

(ii) The total death rate was 17 per cent., including 7 per cent. from uræmia.

(iii) 67 of the patients were admitted in a collapsed state; all the deaths that occurred were amongst these patients.

(iv) Success in treatment depends on the early admission of the patient to hospital, the

death rate amongst patients admitted within the first 12 hours of the-onset of symptoms was 6 per cent. against 60 per cent. amongst those admitted after 24 hours.

CONCLUSION.

This shows the great reduction* in mortality of cholera cases treated by Sir L. Rogers' method, which is the only rational treatment advocated up to date.

IRITIS FOLLOWING CATARACT EXTRACTION.

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"IRITIS, which in its graver forms spreads backward and involves the ciliary body, is probably the most common of the serious complications met with in the after-treatment of cataract operations. The cause in most cases is an infection which occurs at the time of operation; but it may sometimes be derived from the surface of the wound and is occasionally endogenous. Its onset is favoured by any condition which debilitates the patient, such as diabetes, pyorrhœa, and gastro-intestinal disturbances, and by the presence of lens matter in the anterior chamber."(1)

This subject of iritis following extraction of the lens, more particularly in its capsule, was suggested to me by a remark that intracapsular operators were inclined to disregard or overlook those cases of early iritis. The cause of a post-operative intra-ocular inflammation such as iritis may be due to direct infection at the time of operation, or may be endogenous, but in the majority of cases the iritis, which one sees from the fourth to the tenth day after extraction of the lens, is due to the retention of foreign material such as blood, capsule, cortex, or to traces in the anterior chamber of strong antiseptic fluids used in cleansing the conjunctival sac. In the case of capsule and cortex, the irritation is said to be due to the liberation in the anterior chamber of protein bodies, the protein being crystallin, a globulin obtained from the crystalline lens. If, as the figures below show, blood is a causal factor then the irritant may be globin, (the protein radicle of hæmoglobin), serum protein, or serum globulin of the blood plasma or perhaps histidine, the chief amino-acid present in the blood plasma.

Research work on these lines has been carried out from time to time by observers who have interested themselves in the problems of post-operative intra-ocular inflammation. Schirmer(2) in 1899 was the first to point out that the inflammation was not due to infection from without, by proving that the aqueous humour

* The mortality in the Calcutta European Presidency General Hospital, 1895-1907, was 81.6 per cent. Rogers, "Bowel Diseases in the Tropics."

was sterile. Verhoff and Lemoine(3) found that eight per cent. of individuals were hypersensitive to lens protein. They found that in such individuals when a cataractous lens was removed and lens matter was left behind in the eye intra-ocular inflammation resulted, and to this condition, which was not due to direct infection, they gave the name phaco-anaphylactic endophthalmitis. They therefore suggested that an intra-dermal test should be carried out prior to operation, a specially prepared solution of pigs' lenses being used for the test. If the patient proved hypersensitive then he should be desensitized by weekly and increasing doses of a solution of lens protein (pigs') over a period of six to seven weeks. Extraction of the lens then, by the capsulotomy method or an intra-capsular operation complicated by bursting of the capsule, would not be followed by unfortunate results. They further suggested that, should any signs of irritation appear in the eye after operation, the injections should be continued until all such signs had disappeared. Despite prophylactic injections of lens protein, their method of dealing with immature cataracts in patients under fifty years of age by discission followed "at as long an interval as possible" by linear extraction, would not, I fear, find favour, at least in the Punjab. Gifford(4) in a series of eight cases, showed that, apart from any hypersensitiveness of the patient to lens protein, that is in cases giving negative results with intra-dermal tests, severe ocular reaction followed operation where lens matter had been left in the eye, indicating that the cataractous human lens possesses toxic properties in excess of that found in the normal lens of the pig. It would appear, therefore, from such conclusions, that, in order to avoid fallacies, the intra-dermal test should be carried out with standard solutions of normal human lens or of cataractous human lens, preferably the latter because of its apparent greater toxicity. The question of idiosyncrasies to protein injections would also have to be considered.

Again, as statistics to which I shall refer below will show, the presence of blood in the anterior chamber may be a very definite cause of the slighter forms of intra-ocular inflammation, such as iritis, and the intra-dermal test with lens protein, and the intra-dermal test with lens protein, a globulin, may be of less value when the protein body at fault may be globin, a histone, or perhaps the amino-acid of the blood plasma, histidine. That a hypersensitiveness to lens protein does exist cannot be doubted, but as Gifford affirms, the majority of intra-ocular reactions are probably due to the toxicity of the lens matter itself, and hence as he says "a better name for the whole group of reactions would be that of Straub, endophthalmitis phacogenetica." Straub(5) was convinced that the inflammation in these cases was due entirely to the presence of lens matter in the eye; he confirmed the findings of Lagrange and Lacosta(6), who had already in 1911 published the results of their work on this subject.

During the season at Shikarpur this year, 1926, I made careful notes on all cases developing iritis after cataract extraction. For the opportunity and help afforded me in doing this I am indebted to Dr. Holland of Quetta, in whose clinic at Shikarpur the work was done. My object was to collect all cases developing an iritis or an irido-cyclitis, serous or plastic, and to try if possible to come to some conclusion as to the cause of this rather frequent complication following cataract extraction. Retained capsule and cortex had been freely blamed in the past; were these however the only factors present to the action of which the occurrence of post-operative inflammation could be attributed?

In an endeavour to answer this question I examined 1,250 cases at periods extending from the fourth to the tenth day after operation. I found 82 cases of iritis, 66 serous and 16 plastic. Without using the slit lamp it would be very difficult to state dogmatically in any single case that keratitis punctata did not exist, but examining my cases very closely with a good electric light and a binocular loupe I failed to find any signs of precipitates on the posterior surface of the cornea. In these cases the pain, so marked a feature on palpating an eye which is the seat of a cyclitis, was not present. I have therefore used the term iritis and divided the cases into *serous*, where there was simply an exudation of albuminous fluid with some haziness and indistinctness of the iris pattern, and *plastic*, where

TABLE I.

Total cases=82 $\frac{(S) \text{ serous} = 66}{(P) \text{ plastic} = 16} = 6.52\%$				
Causal factor.	Intra-capsular.	Capsulotomy.	Total.	% of 82.
Associated with no definite cause.	17 $\begin{cases} S=10 \\ P=7 \end{cases}$	2 $\begin{cases} S=1 \\ P=1 \end{cases}$	19	23.2
Associated with burst capsule.	9 $\begin{cases} S=7 \\ P=2 \end{cases}$	Nil	9	11.0
Associated with retained capsule or cortex.	16 $\begin{cases} S=16 \\ P=0 \end{cases}$	5 $\begin{cases} S=3 \\ P=2 \end{cases}$	21	25.6
Associated with blood in the anterior chamber.	15 $\begin{cases} S=15 \\ P=0 \end{cases}$	Nil	15	18.2
Associated with iris prolapse.	10 $\begin{cases} S=8 \\ P=2 \end{cases}$	Nil	10	12.2
Associated with keratitis.	8 $\begin{cases} S=8 \\ P=0 \end{cases}$	Nil	8	9.8
Associated with vitreous loss.	Nil	Nil	0	..
Associated with disturbance of iris pigment.	Nil	Nil	0	..
Totals	75 $\begin{cases} S=64 \\ P=11 \end{cases}$	7 $\begin{cases} S=4 \\ P=3 \end{cases}$	82 $\begin{cases} S=66 \\ P=16 \end{cases}$	100

the albuminous exudate showed definite tendencies to form fibrinous networks or membrane. That

in the severer cases an irido-cyclitis was present there can be little doubt though the classic signs of an infection of the ciliary body were absent. According to Verhoff and Lemoine the condition is essentially that of an irido-cyclitis, the iris being infiltrated with lymphocytes and plasma cells with the formation of precipitates on the posterior surface, keratitis punctata. The signs and symptoms were those of an iritis, the treatment that of an iritis or an irido-cyclitis.

This table shows the relative values of the various factors causing iritis. It can be seen that if there were only 15 cases with blood in the anterior chamber, and all developed iritis, then the relative value of blood as a cause of iritis would have to be shown as 100 per cent. and not as 18.2 per cent. as shown in Table I.

TABLE II.

Causal factor.	Intracapsular.			Capsulotomy.		
	Total.	Iritis.	%	Total.	Iritis.	%
Associated with no definite cause.	..	17	..	..	2	..
Associated with burst capsule.	85	9	10.5	..	..	..
Associated with retained capsule or cortex.	60	16	26.6	18	5	27.7
Associated with blood in anterior chamber.	58	15	25.8	1	0	..
Associated with iris prolapse.	138	19	7.2	..	..	..
Associated with keratitis.	59	8	13.5	..	..	..

These tables show that iritis is largely the result of retention in the anterior chamber of protein material, be it the protein of the blood plasma or of the crystalline lens; these two factors alone account for 54.8 per cent. of the cases.

The 8 per cent. of cases associated with keratitis is avoidable if care be taken to remove all excess of mercuric chloride solution from the conjunctival sac before making the incision, either by flushing the conjunctival sac with saline or sterile water, or by using a pipette with which to remove the excess, or by simply depressing the external canthus with the handle of the knife and thus allowing the excess to run off.

To some it may appear paradoxical to talk of retained capsule when the lens has, to all appearance, been removed in its capsule. If an eye, however, be not very carefully examined with a good light and a binocular loupe one cannot be certain that traces of a soft capsule have not been left behind. This probably occurs as the lens is being expressed, part of the capsule being scraped off on the edges of the wound, or rubbed off through the pressure of the hook as the lens is being expressed.

It is interesting to compare the incidence of iritis occurring from this cause in the intracapsular and capsulotomy operations. In the

former, post-operative iritis occurred in 16 out of 60 cases, 26.6 per cent.; while in the latter iritis occurred in 5 out of 18 cases, 27.7 per cent. (See Table II.) When a capsule bursts during an intracapsular operation it is in most cases possible to remove the capsule entire and then, unless the hyaloid membrane has been ruptured, an attempt is made to milk out the cortical matter. In the majority of these cases, however, the lens had been tumbled by Smith's method for tumbling all lenses both hard and soft, so that the capsule usually burst when the lens had been practically delivered, the cortical matter thus escaping into the conjunctival sac. The capsule usually nipped in the wound, was then removed with capsulotomy forceps or, as Smith advises with dressing forceps. The chances of capsule remaining behind were therefore less, hence the smaller percentage of iritis cases, 10 per cent. in this class. The figures therefore would point to capsule rather than to cortical matter being the irritant, the latter after all being readily absorbable.

In an analysis of 24 cases of sepsis I found that 18 could not be attributed to any definite cause, while 3 were associated with bursting of the capsule, 1 with definite trauma, and 2 began as cases of irido-cyclitis. All progressed so rapidly that only a virulent pyogenic infection at the time of operation could have been the cause of the subsequent panophthalmitis. I mention this merely to point out that it is very unlikely that the causes detailed in the above tables would ever lead to panophthalmitis, or to an endophthalmitis similar to that seen as a result of a metastatic infection. In my series of 82 cases, while 23.1 per cent. must be put down to endogenous infection or to direct infection at the time of operation, 25.6 per cent. were definitely associated with retention of capsule, however small, 18.2 per cent. were associated with blood in the anterior chamber, and 9.8 per cent. were associated with the entry of strong antiseptic solutions into the eye, with a resulting mercurial clouding of the cornea.

That the percentage of iritis associated with iris prolapse is so small, 12 per cent., is remarkable, but it should be stated that these cases include 99 where there was a very slight prolapse the iris being covered with conjunctiva, 31 cases where the prolapse was slight but uncovered with conjunctiva, and 8 cases with large prolapses requiring treatment later under a general anaesthetic.

It is very evident then that if blood or lens matter, more especially capsule, be left in the eye it is very liable to cause inflammatory reaction, and it is equally evident that different individuals will react differently to protein matter, with the result that in a few cases at least, severe intra-ocular inflammation will follow operation, with unfortunate results. How then is such post-operative inflammation to be avoided? The answer must be, by preventing blood from entering the anterior chamber and by leaving no

part of the lens behind. A bloodless field can be ensured by the use of adrenalin; the form of operation must depend on the experience of the operator and on his familiarity with the various methods of operative procedure. Personally I favour the Barraquer operation, using atropine to dilate the pupil and avoiding trauma to the iris by doing a simple extraction. The incidence of iritis in a series of 115 Barraquer operations which I did in 1924 was 3 per cent (7). In the above series of cases the incidence of iritis following the intracapsular operation was 6.2 per cent.; following the capsulotomy operation 19.4 per cent. Too much stress cannot be laid on such figures because of the very large number of intracapsular as compared with capsulotomy operations performed. What is much more instructive as revealing the source of the post-operative inflammation is the fact that, both after the intracapsular and the capsulotomy operations where capsular remains were left behind, the percentage of iritis was equal in both cases, approximately 27 per cent. and that capsular remains, together with the retention of blood in the anterior chamber accounted for 50 per cent. of all the cases of post-operative inflammation.

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PRACTICAL POINTS IN BLOOD GROUPING AND THE SELECTION OF DONORS FOR BLOOD TRANSFUSION.*

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Blood transfusion has now an established place in the treatment of many conditions, particularly of course grave hæmorrhage. There are occasions when transfusion of blood will save life when nothing else will do so, consequently the selection of donors becomes a matter of the first importance.

Extensive recent researches have made it clear that the problem of the four blood groups is not quite so simple as was imagined a few years ago. The chief recent additions to our know-

ledge may be classed under two headings:—

(a) Evidence of the existence of more than four groups, or at any rate of individuals whose blood grouping reactions do not conform in all particulars to those of the four well-known groups, i.e., abnormal types. (b) Evidence of the existence of unusually high iso-agglutinin titre in certain group IV donors (universal donors).

It is not proposed in this short paper to enter fully into details, but the question will at once be asked by the surgeon:—Is the value of these blood grouping tests as a safe guide to transfusion thereby impaired? The answer is that blood grouping tests should invariably be done where possible, but the results must always be checked by direct matching tests, owing to the occasional presence of abnormal types. As a result of the newer information it may definitely be stated that no donor can be considered absolutely satisfactory unless he be of the same group as the recipient. Consequently the recipient and the proposed donors should be grouped, and a donor of the same group as the recipient selected. If a donor is used who is of the same group as the recipient, one is transfusing into the patient something very like his own blood—unless an abnormal type be present which would be detected by the matching test—and no reaction other than slight pyrexia from the citrate, if the citrate method be used, is to be anticipated. There is usually time even in a case of grave hæmorrhage for complete tests to be made. If standard grouping sera are not available, the same result can be reached in another way. If the patient's blood be drawn and separated into serum and cells, and the same is done with the donor's blood, then the patient's cells can be tested for agglutination against the donor's serum and the donor's cells against the patient's serum. If both these reactions are negative for agglutination then the two persons tested are of the same group. A study of Moss' table shows that this is so. This method of testing is known as direct matching. It is not possible to find out by this means what the group of the patient is, unless one of the bloods be known in advance. This is not essential, however, and the direct matching test has the great advantage of showing up abnormal types which grouping may fail to detect.

In very grave cases where something must be done within a few minutes, there may be no time for grouping and direct matching tests, and it is then a perfectly justifiable proceeding to use a professional group IV donor who has been used before without bad results. The absence of bad results on previous occasions shows that his serum agglutinins are probably not present in abnormally high titre; and the use of his blood as a donor to a patient of undetermined group, although not so strictly correct as the transfusion of the blood of the recipient's own group, is perfectly justifiable in an emergency. Hundreds of such transfusions from universal donors have

* In this article the Moss terminology is used throughout.

been given without any bad results. If, however, the 'universal donor' is merely known to be group IV and has never before been used as a donor, the position is not quite so simple, as instances have occurred of group IV persons whose agglutinins are present in abnormally high titre. Should this be the case, transfusion of the blood of such donor may result in sufficient agglutination of the recipient's cells to produce a serious reaction. If this 'universal donor' has been used before 'without bad results' to a recipient of another group it shows that the donor's agglutinating titre is not abnormally high, being sufficiently overcome by the dilution which the donor's blood undergoes during transfusion. Ordinarily it is not possible to know the group of a recipient into which blood from a universal donor has been previously transfused, for where grouping tests are available universal donors would not be used. As 45 per cent. of Europeans and 30 per cent. of Indians are of group IV, all the previous recipients of this particular donor's blood might have been of group IV, i.e., his own group, in which case no reaction would follow. This particular donor might nevertheless on account of high agglutinating titre be dangerous when transfused into persons of I, II & III groups. Hence the use of a universal donor should be limited to cases in which nothing better is possible. Fortunately these group IV donors with high agglutinating titre are rare.

Where there is time, the suitability of a group IV universal donor ought always to be checked by a direct matching test, and if the direct matching test be doubly done, i.e., patient's cells against donor's serum and *vice versa*, we have seen above that it is possible to determine that the donor and the recipient are of the same group: even though we shall not by this method find out what the group is. "Where an emergency transfusion has to be done, and no grouping is possible it is safer to depend on a direct matching test than on a universal donor without a direct test, and it is justifiable to depend on a direct test alone," (Levine & Mabee, 1923).

Blood for grouping should be obtained by pricking the end of the well ligatured finger exactly midway between the anterior and posterior surfaces and between the two lateral borders, i.e., exactly in the middle of the end of the finger. If successfully done the puncture will hit off the anastomosis between the two digital arteries and a plentiful supply of blood will be obtained. The first portions should be received into a dry watch glass and allowed to clot, and the serum obtained. The rest should be milked into a small test tube containing one c.c. of normal saline, and the tube inverted several times over the bleeding finger. The blood thus quickly diluted does not clot, but if some time is to elapse before the tests are done, it is advisable to use citrated saline. The standard method of grouping is by two known sera of groups II and III. A drop of each of these

is placed on a different part of a slide, and a drop of the corpuscle suspension added to each, the mixture stirred up with a glass needle and set aside under a cover to prevent drying. With sera of good titre the reaction will be complete within 5 to 10 minutes. The reaction consists in the formation of aggregations of red blood cells which are obvious to the naked eye, looking like fine brick dust.

Serious mistakes can arise if either or both of the grouping sera have lost power. It will be seen from Moss' table that if the blood under examination be group II, and the group III serum used has lost power, the blood when tested will give a negative result with both group II and group III sera. It will, therefore, appear to be group IV, whereas in reality it is group II. If this blood, wrongly grouped as IV, is regarded as that of a universal donor and is transfused into a patient, it may produce very grave symptoms and possibly a fatal result; unless the recipient should happen to be group II, i.e., the same group as the real group of the donor.

MOSS' TABLE OF BLOOD GROUPS.

	Serum of Group I.	Serum of Group II.	Serum of Group III.	Serum of Group IV.
Cells of group I.	○	+	+	+
Cells of group II.	○	○	+	+
Cells of group III.	○	+	○	+
Cells of group IV.	○	○	○	○

+ denotes agglutination.
○ denotes no agglutination.

To avoid grave errors of this kind it is essential to make certain that the sera used are active.

Our practice is to test the unknown blood cells first against known group IV serum. A negative result shows that the unknown group is IV, provided the serum is of good titre. A positive result on the other hand shows that the unknown blood is either I, II or III groups. Then we proceed with the standard group II and III sera. If both results are positive the unknown blood group is I. If group II serum alone agglutinates, the unknown is III; and *vice versa* if group III serum alone agglutinates, the unknown is II. If neither serum agglutinates, the unknown blood is group IV. Having obtained any one of these four results, it is next

necessary to check the grouping sera used. To do this, it is necessary to have cells of known groups in the laboratory; these keep from two to three days in saline in the ice-box, but it is preferable to have living supplies of cells in the shape of persons of known groups in the laboratory. Finally, having obtained a donor of the correct group it is essential to confirm the suitability of the donor by direct matching tests. If this shows positive agglutination an abnormal type is present. Abnormal types are rare, but it is always necessary to be on one's guard against them. The serologist who reports on a blood group incurs a serious responsibility, and no precaution which can possibly be taken ought ever to be omitted. Recent experience has shown that it is not advisable to rely on grouping tests alone.

The actual technique of these tests is simple, but it is necessary to have a thorough understanding of the subject, and to institute full controls. No opinion as to a group should ever be based on negative results alone; e.g., let us suppose unknown blood cells when tested against group II and III sera give negative results in both cases. The unknown blood is then group IV. To confirm this negative result, take the serum of the unknown and test against known cells of I, II and III groups. Positive agglutination should be obtained in each case. If they do not all agglutinate, the unknown is not group IV, and one of the standard group II and group III sera in the first test has lost power.

The correct practice then according to our present knowledge is to proceed as follows:—

(1) The best technique is to group both donor and recipient. Choose a donor of the same group as the recipient, and confirm both the correctness of the grouping and the absence of abnormal types by a direct matching test.

(2) If No. 1 method be not possible, it is best to take a universal donor and check by direct matching.

(3) If neither of the above methods be possible it is justifiable to depend on a direct matching test alone. In such a case it should be done doubly as explained above.

(4) The least satisfactory method is the use of a universal donor without a matching test. This should never be resorted to if it can possibly be avoided.

The result of recent research has been to emphasise the importance of direct matching tests, rather than placing absolute reliance on grouping tests alone.

Coca (1918) has criticised the ordinary methods of grouping on the grounds (a) that they are artificial tests as serum is tested against diluted cells, and (b) that they are not quantitative. He has introduced an ingenious technique for full details of which the reader is referred to the literature. The principle is the testing of the citrated whole bloods of the donor and recipient one against the other, the donor's blood being diluted ten times so as exactly to imitate

in vitro the effect of a transfusion *in vivo* of 500 c.c. of blood from the donor into a recipient who has a total blood volume of approximately 5,000 c.c. The dilutions are carried out in a hæmocytometer white cell counting pipette. The method further shows, in the case of incompatibility whether it is the donor's serum which is agglutinating the recipient's cells or *vice versa*.

Choice of donor.—The ideal donor is a man 20 to 30 years old, free from every kind of disease and with prominent veins in the antecubital fossa. Men are preferable to women. The latter are more liable to anæmia, and their veins are apt to be small and buried in fat: 500 c.c. of blood is a convenient amount to withdraw. Any healthy man can tolerate this without inconvenience, and it is seldom necessary to transfuse more. No donor should ever be selected who is feeling even *slightly* unwell as he may be commencing one of the specific infectious disorders, which might thus be communicated to the recipient. Where repeated transfusions are to be made into the same recipient, *e.g.*, in a case of pernicious anæmia, it is preferable to use a different donor each time; as apparently in certain cases something akin to sensitisation occurs which may lead to undesirable reactions. The mechanism of this is not fully understood.

The question of the communication of diseases by blood transfusion is an important one, though there may be no time in a grave emergency to make elaborate tests for these. The most important disease is syphilis, and wherever possible a Wassermann test should be carried out on the donor. A single negative Wassermann reaction is of course not certain proof of the absence of syphilis, but it is the best that can be done. The communication of malaria, kala-azar and filariasis has also to be considered.

Parents and children are not by any means necessarily of the same blood group. These blood characters are hereditary, and are inherited according to the Mendelian law. Thus if two parents be of group II their children will be either group II or group IV; so that the blood of either parent if transfused into their group IV child would be incompatible. If the child were group II all would be well. Where the two parents are of different groups the children may be of any group.

There is some evidence that skin grafts, should they be taken from another person, 'take' better if the donor and the recipient of the graft be of the same blood group. Should a skin grafting of this kind be contemplated it is always worth while having the blood groups examined.

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A Mirror of Hospital Practice.

A CASE OF PLEURISY WITH EFFUSION.

By AWAT T. SHAHANI, M.B., B.S.,

Medical Officer, J. W. Dispensary, Karachi.

ISARDAO LOKUMAL, aged 51 years, a clerk in the Customs Office, came to this dispensary on the 1st November 1925, complaining of fever, cough, pain all over the body and sore throat. The symptoms appeared to be typical of influenza; he was treated for this complaint, and in a week's time appeared to have recovered.

Four days later I was called in to see him in his house as he was complaining of breathlessness. On examination he appeared to be suffering from asthma. There was no pain in the chest, the temperature was normal and the pulse 84. He was kept on anti-asthmatic mixture, but with no improvement.

On the 16th November I was again called in to see him. To my surprise I found that his chief symptom was pain in the *abdomen*, with breathlessness; the heart was pushed downwards and far to the left of its normal position; the temperature 100°F.; pulse 140. On the right side of the chest there was dullness extending from the third costal interspace downwards. The patient complained of a painful tumour in the epigastrium also; this on examination proved to be the liver, which was pushed downwards. The condition was thus obviously one of pleural effusion into the right pleural cavity, although the patient had never complained of pain in the chest.

Blisters were applied to the right side of the chest and a mixture containing magnesium sulphate, potassium iodide and digitalis given. His condition did not improve and on the 20th November the chest was aspirated. About two pints of clear straw-coloured fluid was withdrawn, and 2 c.c. of this was injected subcutaneously into the abdominal wall. The patient had an irritating cough after the aspiration, but the right side of the chest was now strapped and a mixture given containing potassium iodide, digitalis, nux. vomica, and stimulating expectorants, together with purgatives when necessary. Fortunately the pleural cavity did not refill, and

recovery was rapid; within two months his condition was normal.

Points of interest in the case are:—(1) Pleural effusion as a sequel to what appeared to be typical influenza, with early symptoms of breathlessness but no pain. (2) The insidious onset of the condition. (3) Its rapid progress, since the right pleural cavity appeared to have filled with fluid during the interval between November 16th and November 20th; and (4) his rapid recovery; the chest did not refill and there was no collapse of the costal parietes.

I am much indebted to Dr. V. E. Nazareth, M.D., who assisted me with this patient.

A TUMOUR OF THE SCROTUM AND GROIN SIMULATING AN IRREDUCIBLE INGUINAL HERNIA.

By CAPT. M. K. PILLAI, B.A., M.B., C.M.,

Civil Surgeon, Pegu, Burma.

THE patient, a South Indian Tamil, aged 41 years, working as a cultivator in Burma, was admitted to the Pegu Civil Hospital with a large, elongated tumour of the right scrotum and groin of about 15 years' duration. The scrotal portion of the tumour was hard and slightly tender, the inguinal portion soft, fluctuating, tender and slightly inflamed, with a constriction at its lower part simulating strangulation. The tumour, according to the patient, started about 15 years previously and used to get small or big according as he was regular in his bowels or constipated. For the last year it had been getting bigger. Five days before admission he was constipated and the tumour became larger, more tender, with nausea and loss of appetite. On admission his temperature was 99.4°F. and pulse 100 per minute.

A provisional diagnosis of irreducible inguinal hernia with hydrocele was made and he was operated upon under chloroform anaesthesia the day after admission. On opening the inguinal canal, it was found to contain a hydrocele of the cord. This was removed and the cord was found to be intensely congested, purple in colour and very much thickened. There was no hernia. On examining the testis, it was found hard, very much enlarged, as big as a large *bael* fruit with enlarged veins on its surface. It was diagnosed as a teratoma of the testis and castration was performed and the wound closed up. The patient made an uninterrupted recovery and was discharged cured in a fortnight.

A CASE OF APPARENT ABSENCE OF THE UTERUS.

By J. B. VAIDYA,

MAJOR, I.M.S.,

District Medical Officer, Kurnool.

Mrs.—, married, aged 25 years, came to consult me, complaining of very scanty menstruation and inability to conceive. She stated

that she had first menstruated at the age of 15, but that the quantity was small. Since then she stated that she had had regular monthly menstruation, but that there were only a few drops of blood every four weeks. She did not notice any pain in the abdomen at or between the menstrual periods.

On examination the patient was found to be a robust and well developed woman. Examination of the genitalia shewed the following conditions present. Labia well-formed. A thick and fairly elastic hymenal membrane was found stretching across the vagina. It was complete and did not shew any perforation. On pressure this membrane could be stretched and made to go inwards along what appeared to be the vaginal canal for about $1\frac{1}{2}$ inches, but the finger did not detect any uterus. A finger passed into the rectum also failed to detect any uterus. It met the finger passed into the vaginal canal through the hymen and gave the impression that there was very little tissue between. Scarcely any vaginal wall could be felt between the two fingers.

The patient's history of menstrual flow has to be taken with some scepticism as no orifice could be found in the hymen, even had the uterus been present and merely rudimentary. Probably she had been deceiving herself and others by pretending to have normal periods. She was asked to come for examination at the period of the next menstruation, but has not since returned, and, I understand, refuses to do so.

The case appears to have been one of complete absence of the uterus and of imperfect development of the vagina.

A CASE OF INTESTINAL OBSTRUCTION.

By M. A. KRISHNA IYER, L.M.P.,
Central Jail Hospital, Coimbatore.

A CONVICT, aged about 38, was brought to this hospital in the afternoon of the 15th April 1926, with the following history:—The patient being a Mohamedan (Mopla prisoner) had been starving during the day as it was the fast of the *Ramzan*, and had had his last meal on the night of the 14th April. On the morning of the 15th his condition was normal and he passed both urine and faeces. About 1 p.m., however, he felt as if he had a "catching feeling" in the abdomen on the right side an inch to the right of the umbilicus. He kept quiet until 3 p.m. when he was brought to hospital as his symptoms were worse and he had vomited twice. He again vomited yellow fluid matter after admission to hospital. The pain in the abdomen steadily increased and there was some difficulty in breathing.

On examination his pulse was of full tension and 80 per minute; respiration 23 per minute and laboured, temperature normal, the abdomen much distended on the right side and this area very tympanitic. The right rectus abdominis

was rigid, and the distension was steadily increasing. By 4 p.m. the patient's condition was very bad; he had an abdominal facies with every symptom of shock, a pale and anxious expression, shallow respiration, a cold clammy sweat on the face and forehead and persistent thirst. The pulse had become feeble in tension, but, it is to be noted, not increased in frequency,—about the only favourable sign present.

He was given two successive soap and water enemas without result. Both were retained unaltered and not even flatus was passed. No visible peristalsis was evident. The vomited matter now appeared to consist only of bile. The medical officer of the jail was now called and diagnosed intestinal obstruction and decided on immediate operation. To this the patient absolutely refused.

By 10 p.m. his condition was the same except for increasing distension of the abdomen. He was given $\frac{1}{4}$ grain of morphine and $1/150$ th grain of atropine sulphate hypodermically. A few minutes later he passed into a semi-conscious sleepy state.

Early next morning it was found that he had slept until 3 a.m. when he suddenly awoke, felt as if something had been "dragged down" inside him and passed a stool into the bed containing a little faecal matter and urine. Flatus had also escaped. From this moment his recovery was immediate and striking, and he was discharged in good health three days later.

The interesting features of the case are the rapid onset of symptoms with every evidence of collapse, the very rapid recovery, and the fact that the case terminated so successfully without operation. It is perhaps impossible to say what the condition present was, but every feature of the case—except the pulse rate—suggested intestinal obstruction.

My thanks are due to our medical officer, Lieutenant-Colonel A. Chalmers, I.M.S., for kind permission to publish these notes on the case.

TWIN PREGNANCY IN A BICORNUATE UTERUS.

By A. E. DURAI SAMY, L.M.S. (Singapore),

BICORNUATE uterus is a rare malformation. Twin pregnancy in such a uterus is very unusual, and a case which I attended recently presented some interesting clinical features which render it worth recording.

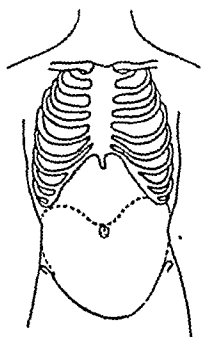
Ætiology.—Malformations of the uterus occur as a result of errors in development. In the early embryo the female reproductive system is represented by the two Müller's ducts. These ducts about the 8th week of intra-uterine life become fused at their lower two-thirds. The septum gradually disappears and the upper half of this portion becomes the uterine cavity, and the lower half becomes canalised to form the vagina. The ununited portions of the ducts become the Fallopian tubes. In the present case,

the tubes remained separated up to the level of the cervix, resulting in a condition of uterus bicornis unicollis. The cervix and vagina were single, the two horns uniting at the os uteri.

The patient, a Tamil woman, aged 26, was admitted on 6th November, 1925, at 8 a.m. with labour pains of 16 hours' duration. She was a well developed primipara in the seventh month of pregnancy.

On admission the uterus was one inch above the level of the umbilicus, with a distinct depression in the centre (as in Fig. 1). The girth of

Fig 1.



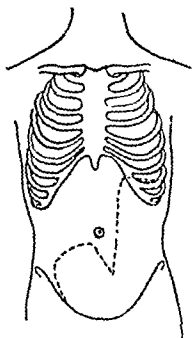
Shape of uterus on admission.

the lower abdomen was larger than one usually sees in a seven-month pregnancy. The various parts of the foetus could not be palpated.

On vaginal examination the os was three-fifths dilated, and the head fixed in a left occipito-anterior position. She delivered a still-born female child at 9-20 a.m. and a complete placenta at 9-30 a.m.

On examination soon after delivery a hard ball-like mass (the contracted right horn of the uterus) was found in the hypogastric and right iliac regions, simulating a fully distended bladder displaced to the right. The left side of the abdominal cavity was occupied by a cylindrical-shaped body, the upper pole of which, lying under the costal arch, proved to be the left horn of the uterus (as in Fig. 2). Another vaginal examination was done but the presenting parts could not

Fig 2.

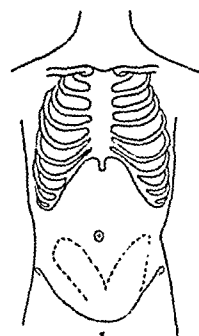


Shape of uterus after the birth of the first child and the placenta.

be reached, and the contracted right horn was displacing the left one up. Under general anaesthesia the whole hand was passed into the vagina and the left scapula and the ribs of a second foetus were felt. The membranes were ruptured and internal podalic version performed. Another still-born male child was delivered at 11 a.m. followed by the delivery of a second complete placenta. Both the babies were approximately of equal size.

During these manipulations, the bicornuate condition of the uterus was confirmed. The separation extended down to the internal os. The cavity occupied by one child had no connection whatever with the one occupied by the other, except at the internal os. The vagina and the os uteri were single. On abdominal palpation, after the delivery, the two horns of the uterus were distinct and the sulcus between them could with ease be followed into the pelvis, and each horn could be moved independently of the other (as in Fig. 3).

Fig 3.



Shape of uterus after the birth of both children and placentas.

The puerperium was normal and the patient was discharged on the tenth day.

PARESIS FOLLOWING EMETINE INJECTIONS.

By B. D. PAL, M.B., B.S.,

Toungoo, Burma.

THOUGH emetine is known to have a depressant action on the muscular and nervous systems, cases of actual paresis following injections of emetine hydrochloride are rare, and the following may be of interest.

Case 1.—A Chinese lady had six hypodermic injections of emetine hydrochloride in the arm; after the third injection she developed increasing weakness in both upper extremities, and eventually could hardly lift up her hand or anything else. The paresis gradually extended to both lower extremities by the sixth injection, and she could not stand or walk properly. The knee-jerk reflex was diminished. The injections were discontinued and the paresis gradually passed off *in toto*. She also complained of great

depression and weakness during the course of treatment.

Case 2.—A European had paresis of the upper extremity following injections of emetine in the arm; he found difficulty in writing and in lifting up anything.

Case 3.—A Burman rapidly developed paresis in both upper extremities, and after the second injection could not pass his urine which had to be drawn off with a catheter thrice daily. The emetine was discontinued, and all these effects passed off.

Case 4.—An Indian developed paresis after the sixth injection; discontinuance of the treatment relieved him of the trouble.

In all these cases, the hydrochloride of emetine ("Tabloid," B. W. & Co.) was used, and several persons were injected from the same tube; (each tube has a dozen tablets). The dose was one grain daily hypodermically, for the first three injections, and then one every third day.

None of the other patients had any trouble. There was no pain or swelling or abscess formation at the site of injection. All the cases were of amœbic dysentery, and were relieved of their complaint by the treatment.

A CASE OF SEVERE SEPSIS ACCOMPANYING DIABETES.

By J. VENKITACHELAM IYER, L.C.P. & S.,
Haripad.

LAST November I was called in to see an adult male Hindu patient who had been bedridden from diabetes and under the treatment of local Ayurvedic practitioners for three months. I found him with a subcutaneous abscess of the left leg extending from the hip joint to the knee, discharging pus through an open sinus. The amount of pus discharged daily through this opening was some 16 to 20 ozs. In the groin above the hip joint was a second sinus, some four inches in depth. On the posterior aspect of the thigh was still a third sinus opening into an ulcer some two inches in diameter and with the bared femur lying exposed at the bottom of the sinus. The patient's general condition was extremely unsatisfactory and he could only turn from side to side with assistance. His temperature when first seen was 101°F., pulse rate 100 per minute, and respiration 32.

Treatment.—I gave an intravenous injection of 5 minims of tincture of iodine diluted with distilled water, and a mixture containing codeine, iron and nux vomica by the mouth. The intravenous injections of iodine were continued and the dose increased to 8 minims in the second week, and finally to 20 minims. The patient was kept on a strictly wheat diet, and Sanatogen and other tonics given. In all, ten intravenous injections of iodine were given.

By degrees the sinuses completely cleared up of themselves, without any local application except protective dressings. It is now four months since the patient first came under my treatment

and he is able to walk and to carry out his domestic business. The sinuses have completely closed. It would appear to me that the excellent recovery which he has made must be attributed to the intravenous injections of iodine.

THE TREATMENT OF BACILLARY DYSENTERY BY CRESOL.

By CAPTAIN C. C. DAS GUPTA, M.B.,
*Chief Medical Officer, Hossainabad Group of Tea
Estates, P. O. Gopalbagan, Jalpaiguri.*

LIEUTENANT-COLONEL F. J. PALMER, in his article on "The treatment of cholera by cresol" published in the *Indian Medical Gazette* for August 1924, mentions that he tried cresol (Sanitol) in a small but severe outbreak of bacillary dysentery with satisfactory results.

In May 1926, I gave cresol a trial in an epidemic of bacillary dysentery at Gopalpur Tea Estate with encouraging results.

The doctor in charge reported that he was treating over 50 cases of dysentery with injections of emetine without any success.

I suspected the outbreak to be due to bacillary infection rather than amœbic. In the absence of a microscope I went round the coolie lines and was shown a number of cases which I clinically diagnosed as bacillary dysentery.

TREATMENT.

I gave m.i. of cresol in 1 oz. of water three times a day for four days. In the majority of cases, with the sixth dose the stools diminished in frequency, were of yellow colour and pain and tenesmus ceased. All symptoms subsided with three more doses on the third day.

In bad cases I also gave injections of anti-dysentery serum 25 c.c. under the skin of the abdomen with good effect. Sanitary measures, e.g., disinfecting drinking water from the tube well by chlorogen; sprinkling of bleaching powder in the lines to keep down the flies, etc., were undertaken. Now that dysentery has broken out in the Duars I would request the profession to give cresol a fair trial and to report their experiences.

The coolies object to being pricked by the needle. It would be a great boon if oral administration of cresol in bacillary dysentery proves as efficacious as the essential oils' mixture of Dr. Tomb in early cases of cholera.

A CASE OF MEDDLESOME MIDWIFERY.

By A. VISWANATHAN, L.M.P.,
Civil Hospital, Papun Salween, Burma.

E. KAM, a Shan woman, aged 35—a 4th-para, had difficult labour on the 13th June, 1926. She was attended at first by an untrained *dai*, who called in a trained nurse-midwife about 6-30 a.m. The latter found that the head of the foetus had been born, but that there was no further progress in delivery. I was sent for by the nurse and reached the house about 7-30 a.m.

I found the patient in a condition of collapse, with the pulse feeble and almost imperceptible.

The uterus was very hard to the touch and tender. Labour pains had ceased some four hours previously. The foetal head was born and was in a state of extension, with the occiput lying posteriorly, and the neck firmly gripped. The face of the foetus was blue, and more than half the brain substance was protruding through the posterior fontanelle,—the skin having already given way under pressure. The foetus was undoubtedly dead.

I concluded that the case was one of impacted shoulder presentation, owing to the vigorous pulling by the *dai* on the child's head plus the pressure of the uterine contractions. On putting my hand into the vagina I found the anterior shoulder incompletely rotated to the front, and the arm extended.

The child's head was gently pushed up with my left palm, whilst with my right fingers I brought the anterior arm out over the child's chest, and at the same time its head was twisted through a half circle. No sooner was this done than the arms, the shoulders, trunk, etc., were delivered in quick succession spontaneously.

The uterus was so exhausted that I did not expect natural expulsion of the placenta and seeing the patient's bad general condition I expressed it out by Credé's method.

The usual treatment for collapse was adopted. The husband was asked to report to me if there was severe bleeding, which I expected owing to her multiparity, the presence of secondary uterine inertia and extreme violence to the uterus.

It is now the tenth day of her puerperium. She is doing well, with no hæmorrhage, no sepsis.

The points of interest in the case are (1) the protrusion of the brain substance indicating the extreme force which the untrained midwife must have used, whilst the shoulder was already impacted. (2) The impaction of the shoulder as a result of pulling on the foetal head. (3) In spite of her multiparity and the presence of secondary uterine inertia there was only a small amount of bleeding which was controlled by ordinary means. (4) The inevitable danger of such untrained midwives practising without any legal check.

There is no prospect of the patients or patients' relatives suing the untrained midwife for mal-praxis or for damages since they are generally poor and superstitious. It is time that legislation in Burma be invoked to restrain the unqualified from practising. Such legislation would reduce to a certain extent the numerous stillbirths arising from this cause.

A CASE OF HYDROCEPHALIC MONSTER.

By A. S. DAWSON, L.M.P.

Thongé, Tharrawaddy District, Burma.

MA NWE, a Burmese female, 25 years of age residing in Zigon, a village near Thonze, was brought to the Civil Hospital, Thonze on the 21st May, 1926, at 6 A.M. in labour.

Previous History.—The menstrual history was normal. She had not suffered from any serious illness prior to the pregnancy; she stated that she had been in good health up to the time of the present labour. She was married for the last 8 years. In her 18th year she became pregnant for the first time and gave birth to a full term baby but the child died after 7 days. About 2 years later she had a second pregnancy, the child this time also was born normally and is still alive and is sound health. Two years later (after the second pregnancy), she had the present conception. This pregnancy advanced to full term but the abdomen was noticed to be larger than in her previous pregnancies. About 3 days before admission, i.e., on the 19th May, 1926, she had labour pains; after 24 hours the membranes ruptured and all the liquor amnii escaped, the pains became very dull and at longer intervals. She was attended by an untrained local midwife who made her wait for two more days for the birth of the child, but finding that the patient was getting worse with a foul smelling discharge per vaginam advised her to go to hospital.

Condition on Admission.—General state of health and pulse good. Temperature on admission 100.6°F., bowels constipated.

The uterus was found to be uniformly filled up, thus giving a false impression of the occurrence of twins. Auscultation did not reveal anything, and the foetal heart sounds were inaudible.

Vaginal examination showed the os fully dilated, a big tumour-like boggy sensation to the examining fingers suggesting that the presenting part was the breech but on careful examination the case appeared to be one of hydrocephalic monster. A sanious discharge of foul smelling character escaped with a few pieces of broken membranes. It was decided to perform craniotomy immediately and this was carried out under chloroform anæsthesia. On perforating the presenting part (the head), straw coloured liquid escaped in large quantity. With the aid of the cranioclast and the cephalotribe the perforated head was extracted with much difficulty. The placenta was expressed normally and there was some post-partum hæmorrhage controlled by an injection of 'Hæmostyl' 8 c.c., and 2 c.c. of pituitrin intramuscularly. The same evening the patient had a temperature of 100.6°F. A uterine douche was given. The next morning the temperature fell to 99°F. The patient felt very well and was discharged on 25th May, 1926, quite healthy. My thanks are due to Dr. R. Brahuspathy of Prome, who assisted me in the operation. A short description of the hydrocephalic monster follows:—

Its head consisted mostly of soft parts and measured 14 inches by 7 inches by 6 inches, with hairs about 1 inch in length. Anteriorly there were two small transverse slit-like apertures representing the position of the eyes but without any eyeballs. There were no nostrils; nor nose proper, but their place was taken up by two short

small holes leading into the mouth by the shortest route. The mouth had a thick broad tongue with the upper part cleft as in the condition of harelip and there were leathery teeth, 6 in the upper jaw and 4 in the lower jaw. The body parts were well developed and resembled those of a six-months' aged baby. Two testes lay in what apparently appeared to be a divided scrotum; representing a penis a small thick prominence without any aperture was found at the top part of the genital parts. Just below the latter part there was only one opening from which meconium escaped; this represented the anus. On dissection there was no uterus or bladder but the ureters opened into the lower part of the large bowel which was found to open into the anus externally, as above mentioned.

A photo of the monster was taken but unfortunately it was spoiled.

A CASE OF MALARIAL HÆMOPTYSIS.

By K. L. BASU MALLIK, M.B.,

Chief Medical Officer, Ludlow Jute Co., Chengail,
Howrah District.

CASES of hæmoptysis due to malarial infection must be exceedingly rare, yet the case about to be recorded appears to be one. During the past 6½ years I have had occasion to treat 1,056 cases of acute malaria and 6,388 of chronic malaria, yet I have not previously seen hæmoptysis, apparently due to malarial infection. In Osler and McCrae's *System of Medicine*,* where a comprehensive list of twenty groups of causes of hæmoptysis is given, including even hysteria as a cause, malaria is not mentioned. Herbert French's invaluable book *Differential Diagnosis*† also does not mention it; though one now feels inclined to insert malaria as a cause of hæmoptysis in his group D (7) under the heading of "malignant types of specific fevers, such as variola and measles."

Castellani and Chalmers‡ state that the parasite of malignant tertian malaria, *Plasmodium falciparum*, may affect the pulmonary system in three ways; viz., pseudo-bronchitic, pseudo-pneumonic, and pseudo-pleuritic types of symptoms occurring. The case here reported was of pseudo-pneumonic type, closely resembling ulcerative tuberculosis of the lungs, but the latter disease can be excluded by the repeated daily examinations of the sputum with negative results, and by subsequent physical examination of the patient a few months after the attack. The following are particulars of the case.

The patient, A. Hamid, Mahomedan male, a rove cooly in a jute mill was brought to hospital on the 10th November 1923 suffering from high fever, cough, and spitting of blood. The fever had commenced four days previously with spitting of blood. For two days the fever had abated to a certain extent, and the patient,

being very poor, had resumed his work in the mill. He only worked for part of a day when the fever became very high and copious blood appeared in the sputum.

The patient lived in the village of Chengail just outside the boundary of the premises of the Ludlow Jute Mill in a *kutcha* hut together with another man. The latter however died on the fourth day of illness from fever and unconsciousness; and thereupon the patient, being terrified of impending death from his own fever managed to scramble up to the Company's coolie lines, where he was picked up and sent to the hospital by the sanitary staff.

His previous history was not important. He had been in Mesopotamia in 1920; had had an injury to his left side; and a previous attack of dysentery. He had had no recent injury to the chest, and denied all history of previous hæmoptysis. He used at one time to drink heavily, and was habitually constipated. His family history shewed that his father and one brother had died of fever; he has two brothers living, both well and healthy.

Condition on admission.—The patient was very ill and coughing up blood in fairly large amounts; temperature 103°F.; pulse 120 p.m.; respirations 46 p.m.; blood pressure 80/45. Palpation and percussion of the chest were carefully avoided. Auscultation of the lungs shewed crepitant râles at the base of the left lung, and especially in front. The right lung was clear. The sputum was examined for tubercle bacilli but none found, also no elastic fibres.

The first heart sound was feeble, but the heart seemed otherwise normal. The throat and nose shewed nothing to account for the hæmorrhage. Other systems were normal.

The death of the patient's room mate, however, was suggestive of cerebral malaria in his case. Accordingly blood films were taken. These shewed scanty hair-like rings of *Plasmodium falciparum*, but no crescents.

The total leucocyte count was 11,500 per c.mm. The differential leucocyte count was:—eosinophiles 2 per cent., polymorphonuclears 70 per cent., small mononuclears 16 per cent. and large mononuclears 12 per cent. The hæmoglobin index was 70 per cent.

The urine was normal.

Treatment.—An immediate enema was given, followed by copious stools. An immediate hypodermic injection of digitalis and strychnine was also given, and about two hours after admission 15 grains of quinine bihydrochloride intramuscularly. The patient was then put on to 10 grains of quinine bihydrochloride in solution every four hours by the mouth.

The next day—6th day of illness—copious hæmoptysis was still present and a patch of consolidation at the base of the right lung was well marked. The temperature however was normal. Morphia with atropine was given hypodermically, a dose of magnesium sulphate, and calcium lactate, 20 grains by the mouth every three hours. The oral administration of quinine was continued.

On the 7th day of illness there was very little blood in the sputum, but the patient complained of collapse. Quinine and calcium lactate were continued. By the 9th day of illness the sputum was free from blood, but a diffuse bronchitis was present in both lungs.

The subsequent course of the case was uneventful. The lung condition cleared and sputum could only be obtained for examination by forced coughing. Expectorants were given during the earlier course of his stay in hospital and the oral administration of quinine continued. The patient was discharged in good health on the 21st day of illness, and advised to continue with quinine for another ten weeks.

The sputum was examined upon twelve occasions during his stay in hospital, but neither tuberculosis bacilli nor elastic fibres were ever found. He was physically examined some months after he left hospital and no evidence of pulmonary infection could be found.

The case appears to have been one in which the hæmoptysis was due to a pseudo-pneumonic

* *System of Medicine*. Osler and McCrae, Vol. II, Second edition, p. 951.

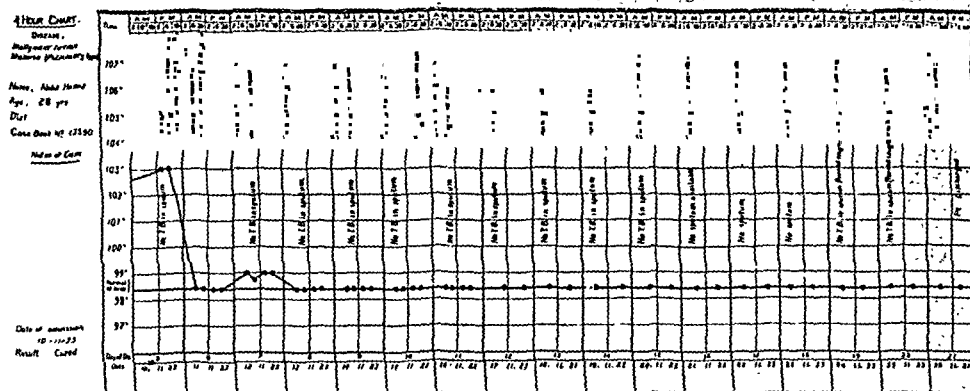
† *Index of Differential Diagnosis of Main Symptoms*. Herbert French. Second edition, p. 287.

‡ *Manual of Tropical Medicine*. Castellani and Chalmers, 1919.

condition of the right lung supervening on an infection with malignant tertian malaria. The temperature chart was as shewn.

Whey as a drink, the same mixture by the mouth temperature 102° F. and condition better.

On the seventh day, treatment as on the sixth



The patient resumed his work in the mill after a few days' rest and was seen quite healthy in 1925.

The history of the case was very suggestive of malignant tertian infection and this was what put us on the right track. In a practice among the illiterate classes in malarious villages it is not unusual to hear of cases of high fever followed by coma and death—cases of the comatose form of malignant tertian fever; so the death of the patient's room mate from fever and coma suggested the nature of the possible infection.

In the present case as the condition of the patient was very bad and blood pressure low (80/45) intravenous quinine was not attempted and a stimulant injection of strychnine and digitalin given. One intramuscular injection (grs. xv) of quinine bihydrochlor followed by 30 grain doses of the same dose daily by the mouth cured the patient.

A CASE OF FACIAL ERYSIPELAS SUCCESSFULLY TREATED BY BRILLIANT GREEN.

By C. C. PAUL, M.B.,
Nutanjanj, Burdwan.

Mrs. X., aged 18, a Hindu female had facial erysipelas. I saw her on the second day of illness and gave her polyvalent anti-streptococcal serum, 10 c.c. subcutaneously. The highest temperature of the day was 102° F.

On the third day of illness 20 c.c. of the same serum was given subcutaneously and a mixture containing quinine, iron and calcium by the mouth: the highest temperature of the day was 102° F.

On the fourth day, the 20 c.c. of serum was given subcutaneously, the same mixture by the mouth. The inflammation had now much increased and the highest temperature of the day was 105° F.

On the fifth day, 30 c.c. of the serum was given subcutaneously, the same mixture by mouth and the highest temperature of the day was 105° F.

On the sixth day 5 per cent. brilliant green solution was given as a local application, milk

day; the lowest temperature was 99° F. and the highest 101° F.

On the eighth day the same treatment: the lowest temperature 98.4° F. and the highest 100° F.

On the ninth day the same treatment was given; the temperature normal throughout the day.

On the tenth, eleventh, twelfth and thirteenth days the same treatment was given; temperature remained normal throughout.

REMARKS.

(1) Local application of a 5 per cent. solution of brilliant green, as advised by J. E. Adams, worked wonders in this case.

(2) Milk whey internally did good.

My thanks are due to Dr. J. C. Aich, M.B., Teacher of Medicine, Ronaldshay Medical School, Burdwan, who also attended the case with me, for his kind permission to publish the case.

A CASE OF MYOSITIS OSSIFICANS.

By CH. KRISHNAMURTY,
Sub-Assistant Surgeon, Sompeta, Ganjam District.

K. J. H., a Hindu male child, was brought to me by his father with the following history:—Eight months previously a new growth of bone had been noted on the left side about the middle of the back. This had developed into three nodules, each the size of a marble, below the inferior angle of the scapula. A similar new growth of bone had subsequently arisen on the right side of the back and had become absorbed spontaneously. After this a new growth of bone appeared on the right side of the chest, which also disappeared spontaneously.

On examination of the child there was present new growth of bone at the nape of the neck, on the inner side of the upper part of the right arm, on the upper part of the sacrum, over the collar bones, and in front of the left side of the chest. The boy was unable to stretch his right arm, or to bend his neck; he could neither walk or stand properly. He stood with his right leg bent and with a pitiable expression. There was no involvement of the facial bones.

I regret that I have no facilities available locally to send a photograph of the patient.

Indian Medical Gazette.

OCTOBER.

NEW CONCEPTIONS IN AMŒBIASIS.

THE time has come perhaps to review a series of papers, published during recent years, which threaten to almost revolutionise our conceptions of amœbic dysentery and of amœbiasis generally. Successful treatment of a disease can only be based upon a very clear understanding of its ætiology and pathology, and it is in this respect especially that these papers constitute so important a group.

Prior to the Great War our knowledge of "the amœbæ living in man" was in an utterly chaotic condition. *Entamœba coli* was discovered first by Lewis and Cunningham in Calcutta in 1870-1871; and they unfortunately termed the parasite "*Amœba coli*." *Entamœba histolytica* was first discovered by Loësch in St. Petersburg—(as the Russian capital was then named)—in 1875, and by him most unfortunately also termed "*Amœba coli*." Matters were not improved by Schaudinn in 1903; it is true that he introduced the names *Entamœba coli* and *Entamœba histolytica*, but his accounts of both organisms were erroneous, whilst his dominant position in the protozoology of that day meant that no one dare run counter to his assertions. "Notwithstanding his great services to the science of protozoology in other respects," writes Dobell (1919), "his influence upon the present subject was almost wholly bad. His work produced a profound effect, though it was merely a brief preliminary statement of his views—dogmatic, full of errors, unillustrated; and his conclusions, had they been presented by any other worker, would probably not have been accepted without further evidence. There was indeed but one fundamental point on which he was not mistaken, his assertion that there are two different amœbæ, one pathogenic and the other harmless, inhabiting the human bowel. Schaudinn's 'life-histories' of the two forms were almost entirely wrong. Some of his observations and experiments are, indeed, so incredible that it is difficult to believe that they were not sheer inventions."

From this muddled origin, confusion became worse confounded. Worker after worker, dealing with stale stools, using bad fixatives and indifferent stains, described amœba after amœba as inhabiting the human intestine. Musgrave and Clegg in the Philippines (1904, 1906)—upholding the thesis that "all amœbæ are or may become pathogenic, disregarding morphological differences as being entirely unworthy of note, and failing entirely to differentiate between the free-living amœbæ of soil and water and the truly parasitic entamœbæ—came to the conclusion that "the whole of the surface flora of the Philippine

Islands carries a large number of these parasites. Some of them at least, belong to the class which produces disease in human beings."

Finally, the whole muddle was transferred to the text-books on tropical medicine; thus the 1919 edition of Castellani and Chalmers's *Manual of Tropical Medicine* describes no less than 21 species of amœbæ which may possibly live in man; according to Dobell (1919) *E. coli* has been described under 22 different synonyms, and *E. histolytica* under 33 different synonyms. As Dobell succinctly remarks, the literature on the human entamœbæ between 1870 and 1900 is probably clearer and more accurate than that between 1900 and 1914.

The work of a few early pioneers at this period, however, calls for note. Thus Walker and Sellards (1913) in the Philippines proved that infection in man is acquired by swallowing the resistant cysts of the entamœbæ, and that contamination of food and water supplies is the method of transmission of amœbic infection. Further, Walker (1911) clearly differentiated the free-living and non-parasitic amœbæ of the Manila water supply from the parasitic entamœbæ of man and showed that *E. coli* and *E. histolytica* were clearly different species. The work of W. M. James (1914) in Panama further helped to differentiate between the species.

Then, in 1914, came the Great War. It was soon realised that dysentery was going to be one of the big medical problems of the war, and especially of the British and Indian and colonial forces fighting in the tropical war zones. What these troops suffered through the want of knowledge of the pathologists and medical officers of those days it is difficult to estimate. It was a case of a little knowledge being a dangerous thing. It was believed that almost all the dysentery in Mesopotamia, the Dardanelles, Egypt and other tropical and sub-tropical war zones was of amœbic origin; whereas we now know that some five-sixths of the dysentery in the tropics is of bacillary and not amœbic origin. It was not realised that emetine is a drug with a severe cardio-depressant action, and one which needs to be carefully administered under full supervision—(when its use in amœbic dysentery is invaluable). Patients suffering from severe bacillary dysentery were drenched with drastic—and not infrequently dangerous—courses of emetine. A preconceived idea triumphed over common sense and the necessity for impartial enquiry, and dysentery plus emetine probably killed their thousands.

It will always be to the honour of British protozoologists, of the British War Office, and of the then newly formed Medical Research Council, that the true state of affairs was investigated under their auspices. The bacteriologists, entering the field with no preconceived ideas, soon found that the great majority of dysentery cases were of bacillary origin. Thus Ledingham, Penfold and Woodcock (1915), and Ledingham (1920) "formed the opinion that the majority of

cases received from Gallipoli had suffered from bacillary dysentery, and not from amoebic infection. A similar conclusion was reached by the workers on returned convalescent cases at the London Hospital.*

Finally came the pioneer work of Wenyon and O'Connor at Alexandria over several years—summarised in their *Human Intestinal Protozoa in the Near East* (1917); and the splendid work of Dobell at Hampstead, who himself examined in four years over 10,000 stools from returned intestinal cases from the different war fronts;—work which resulted in the publication of his *Amoeba living in Man*, (1919).

With the publication of the latter work, a clear-cut picture of amoebiasis was presented to the medical world, and this picture we may now try to summarise, as it is its subsequent modifications with which we desire especially to deal. In brief, it may be stated, that some five-sixths of the dysentery in the tropics is of bacillary origin, and some one-sixth of amoebic origin; though mixed infections are not uncommon. Mankind throughout the world, from the Esquimaux in Greenland to the few remaining aborigines in Australia, is parasitised to the extent of 8 to 10 per cent. with *E. histolytica*; in the tropics the incidence of infection is higher—perhaps some 12 to 15 per cent. of persons being infected; and the greater the number of examinations made of the stools and the greater the care exercised in such examinations, the larger becomes the percentage of persons found to be infected.

Infection is acquired by swallowing the cysts of the parasite. These are conveyed in contaminated food or water supplies, sometimes perhaps through the agency of flies which visit first the latrine and then the dinner table; but most often through the agency of "carriers." It is especially "carriers" who have to handle food-stuffs such as cooks in a jail or in a regimental mess, or mess servants and personal servants that are responsible for conveying the infection.

Once the cyst is swallowed it passes through the stomach unchanged, as it will withstand the action of both pepsin and hydrochloric acid. It will not withstand the action of trypsin, however, at body temperature, and presumably de-cystation occurs in the lumen of the small intestine. As the cyst of *E. histolytica* possesses four nuclei, presumably four little amoebae emerge from the cyst, pass through the ileo-cæcal valve and in the colon make for the mucous membrane through which they penetrate to reach the sub-mucous layer. Here they settle down. Unlike the other intestinal entamoebae of man—which are harmless commensals and which live in the lumen of the gut—*E. histolytica* is essentially a tissue-invading amoeba with pathogenic properties.

In some 90 per cent. of persons so parasitised, however, there are no symptoms. These people

are "carriers" of *E. histolytica* infection. In them the entamoebae lie at the bases of tiny ulcers in the mucosa of the colon, and there multiply by binary fission. They secrete a powerful proteolytic ferment which dissolves the cells around them, and on this richly nutritious tissue juice the amoebae live. They also ingest red blood corpuscles, but nothing else. Bacteria, yeasts, etc., are never ingested by *E. histolytica* and its protoplasm is sterile. The ulceration is so slight that no symptoms result, and the patient does not even know that he is infected. Nature is constantly at work healing these minute ulcers, whilst the amoebae are constantly at work causing tissue lysis, and amidst this almost balanced warfare the amoebae live. To quote Colonel Alcock, in his review of Dobell's book, the carrier "is in the position of Prometheus, with amoebae perpetually gnawing at his gut, and the gut renewing itself as fast as it is eaten away—but, unlike Prometheus, in suffering no torments during the process."

This carrier condition may persist perhaps throughout life; in one instance recorded by Dobell the patient appears to have been infected for 34 years. It is one of the most difficult conditions to treat in tropical medicine; any one of half a dozen remedies may seem to cure it, but repeated subsequent examination of the stools only too often shews that the cure is apparent, and not real.

In itself the carrier condition may appear to be harmless, but in reality it is a most dangerous one. In the first place the carrier is a danger to others; from time to time the infective cysts of *E. histolytica* are passed in his stools, and may infect food or water supplies and hand on the infection to other people. Especially if he be a cook or have anything to do with handling food-stuffs, is he a danger to other persons. Hence in the British army, during the later phases of the war and subsequently, the effort was made to examine all suspected individuals and to eradicate the infection in all carriers. This attempt failed.

Secondly, the carrier is a danger to himself. At any time, from fatigue, chill or any one of a dozen causes, perhaps, his resistance may break down; the amoebae may get the upper hand, the ulceration in the colon become extensive, and amoebic dysentery supervene. Further, the appendix is not infrequently involved, and *E. histolytica* may possibly be a factor in the causation of appendicitis in a few instances. On the other hand, the ulceration may open up a blood vessel, and the vegetative forms of *E. histolytica* from the mucosa of the colon may enter the portal blood stream. In this they pass to the liver. Here, true to their function in life, they cause tissue lysis and a liver abscess results. Inasmuch as the protoplasm of *E. histolytica* is sterile, the "pus" of such liver abscesses is sterile, unless secondary contamination—e.g., with *Bacillus coli communis*—has occurred. Or, passing through the liver, they may very rarely cause

* *Official History of the Great War. Medical Services. Pathology*, p. 285. London: H. M. Stationery Office. 1923.

amoebic abscess of the brain—(although, according to Wenyon, 1926, he has never seen amoebæ in sections of material from such cerebral abscesses),—or even more rarely still amoebic abscess of the spleen. Finally, the sequelæ and complications of amoebic dysentery or of amoebic hepatitis may supervene. In brief, the carrier lives—as it were—over a powder mine, and at any moment it may blow up. On the other hand the chances are nine to one that he will never even know that he is infected.

Finally, as the amoebæ emerge from the ulcers in the colon mucosa, enter the lumen of the gut and pass down it towards where the fæces are solidifying, they encyst. In the formed stool of the carrier these cysts are found. When the stool is passed—on to the ground, as it usually is in the tropics—all immature cysts and a considerable proportion even of the mature tetra-nucleate cysts die off, but a proportion of the latter survive, to carry the infection over from man to man.

With regard to the (four) other amoebæ living in the intestine of man, they do not possess tissue-invasive properties; they never ingest red blood corpuscles; the evidence all goes to show that they are absolutely harmless commensals; but it is important that the laboratory worker shall know how to recognise them; and not—for instance—give a diagnosis of amoebic dysentery, based upon finding the vegetative phase of *E. coli* in a bacillary dysenteric stool. The examination of a dysenteric stool should always be made within two hours or less of its passage, since the amoebæ in it rapidly degenerate, become unrecognisable, and die. Further, a mere examination for *E. histolytica* is not enough. Every dysenteric stool should both be examined microscopically and also plated for dysentery bacilli on MacConkey's or other special medium. Mixed infections are not rare; scanty vegetative forms of *E. histolytica* may be found in the stool of a person who is a carrier of *E. histolytica*, but who is suffering from an attack of bacillary dysentery; and no laboratory diagnosis is complete without the dual test.

Thus, out of chaos, order was established. With the publication of Dobell's *Amoebæ living in Man* in 1919, our conceptions of amoebiasis may be said to have become crystallised.

Subsequent papers of recent years however have raised questions which may tend very considerably to modify our views as to the complete accuracy of the above account.

(1) In the first place it has been shown by Sellards and Theiler (1924) that de-excystation of the cyst of *E. histolytica* may occur in the lumen of the colon and even of the rectum. These observers collected washed cysts, free from any admixture with vegetative forms, and injected them by laparotomy into the colon of kittens. The animal having been anaesthetised, and the abdomen opened, a broad silk ligature 5 mm. wide is tied around the colon about 3 cms. above the anus, so as to completely occlude the lumen

of the gut but not to cause constriction. The suspension of washed cysts is now carefully injected into the lumen of the gut with a hypodermic syringe, using a total quantity of about 2 c.c. of fluid. After the operation the animal is given abundant fluid to drink, but no solid food. Under these circumstances intestinal stasis sets in in the colon and its contents become fluid. The animal goes down with acute amoebic dysentery in from three to five days' time, and examination of its colon shews extensive local ulceration and numerous vegetative forms of *E. histolytica* present. This work has been confirmed by Hoare (1925) who uses a simpler technique; the emulsion of washed cysts is injected per rectum and the anus sealed for three days by a cotton wool plug soaked in celloidin; amoebic ulceration of the rectum results in from 10 to 20 days.

If the cyst of *E. histolytica* can de-excyst in the colon, it would appear that the encysted forms may constitute a source of fresh infection of the colon mucosa to the carrier himself. The cysts are exceedingly resistant to any form of treatment, and it may be possible that, although the vegetative forms in the mucosa may be eradicated, fresh infection may take place from de-excystation of cysts lying in the lumen of the gut.

Further, an obvious inference from the experiments of Sellards and Theiler is that intestinal stasis plus a very fluid condition of the contents of the colon may be important ætiological factors favouring infection. This may explain why one individual becomes parasitised whereas another does not.

(2) Not only may cysts de-excyst in the lumen of the carrier's colon, there is now partial evidence that the vegetative forms of the *E. histolytica* may possibly also live there; that *E. histolytica* is not invariably a tissue-invasive parasite. No direct evidence of this exists, but it may be inferred from the cultural work of Boeck and Drbohlav (1924, 1925). These authors were the first successfully to cultivate *E. histolytica* in vitro.* The medium used is a solid medium of coagulated white of egg in Locke's solution, covered with a fluid medium of inactivated serum diluted with Locke's fluid. Vegetative forms, when inoculated into this medium grow well at 37°C., and a rich culture results. Within 48 hours numerous actively motile forms are found. But a most extraordinary change takes place in the habits of the parasite when grown in vitro. It is still fully viable, and highly motile, its nuclear structure and morphology are the same as before, but it now takes to feeding actively upon bacteria, which it never does in the tissues. The work of Boeck and Drbohlav has now been confirmed in practically every large laboratory in the world and this extraordinary change in the biology of the parasite

* Reviewed in the *Indian Medical Gazette*, February 1926, p. 90.

has been verified by every worker who has studied the subject. It would appear as if *E. histolytica* can vary its habits according to its environments, in the tissues its protoplasm is sterile, it lives on pre-digested tissue juice and never feeds upon bacteria; in the dysenteric stool it takes to feeding upon red blood corpuscles; in culture *in vitro* with neither of these sources of nourishment available, it takes to feeding upon bacteria.

If so, then may it not be that the vegetative forms of *E. histolytica* may be capable of living in the lumen of the colon of its host, and there feeding upon bacteria? In other words, can we have latent infection in the lumen of the gut alone; cysts capable of de-excysting in the colon, and even vegetative forms capable at any time of invading tissue?

(3) The cultivation of *E. histolytica in vitro* may be expected greatly to increase our knowledge of this parasite, and perhaps to lead to very important advances in the treatment of amoebiasis. One fact which is now apparent is that in its vegetative phase *E. histolytica* is very susceptible to changes in temperature. Thus at Calcutta on two occasions when the gas supply to the 37°C. incubator failed over-night, rich cultures of *E. histolytica* were found to be dead the next morning. Further, de Rivas (1926) found that the vegetative forms are killed by ten minutes' exposure to a temperature of 45°C., and in a few minutes at 47°C. Hence the very interesting suggestion of this author to treat chronic amoebic infection of the colon by large irrigations of very hot saline. Having found that saline run in at temperatures of from 42°C. to 47°C. can be tolerated in animals, he has treated eight cases of chronic amoebic dysentery by repeated lavage of the colon with from 700 to 2,000 c.c. of saline run in at temperatures of from 42°C. to 47°C. Not only this, but using a similar administration by the duodenal tube, he claims that infections of the intestine with *Giardia intestinalis*, hookworms, tapeworms and other protozoal and helminthic parasites can possibly be eradicated by this simple line of treatment. His paper is a preliminary one, however, and further study of the possibility is needed.

(4) What exactly happens during the process of de-excystation of *E. histolytica*? It is to be hoped that cultural methods will soon give us a clear answer to this question. Yoshida (1920) by a special technique placed cysts of *E. histolytica*—washed free from bacteria—in the water of condensation of a defibrinated blood-agar medium at from 28°C. to 30°C. and studied the process of de-excystation. He claims that of the four nuclei within the cyst two degenerate, the other two fuse by autogamy, and that a single mononucleate amoeba emerges from the cyst. This process, if indeed it occurs, would be one of considerable interest; nuclear re-organisation is a not infrequent biological phenomenon among the Protozoa and may pave the way to a rejuvenation of the strain after repeated generations

of simple fission. On the other hand, interesting as Yoshida's microphotographs are, his plates and his account of the process are very far from convincing. It is difficult to see why nuclear division should occur within the cyst if multiplication of the individual within the cyst is not about to take place. The matter must be left *sub judice*.

(5) What are the factors that determine that in one individual infection with *E. histolytica* leads to amoebic dysentery, whilst in the majority of individuals it only leads to the carrier state? If we could answer this question fully, we could deal much better with the question of prophylaxis. It has been shewn that intestinal stasis and a very fluid condition of the contents of the colon may be aetiological factors. This is further confirmed in an admirable paper by Clark (1924) who reports the results of 186 *post-mortem* examinations on fatal cases of amoebiasis. The distribution of the lesions was found to be as follows:—(a) scattered throughout the colon, 113 cases, or 61 per cent.; (b) isolated areas alone involved, 63 cases (34 per cent), chiefly in the caecum, ascending colon, iliac colon, rectum, and hepatic flexure—in that order of frequency; (c) 10 cases where no ulcers, but only scars, were found; these being cases of death from secondary infection of other organs. The appendix was involved in 41 per cent. of the cases, and the lower end of the ileum or the ileo-caecal valve in 5 per cent. It is at the sites of stasis—such as the caecum, and at the flexures, that ulceration especially tends to occur.

Boeck and Drbohlav record that the pH of their culture medium for *E. histolytica* is from 7.2 to 7.8, and that the amoebae grow well within this pH range. On the other hand Knowles, Napier and Das Gupta (1923), and Acton and Knowles (1924) record that the freshly passed stool in acute amoebic dysentery is markedly acid in reaction; even acid to litmus paper as a rule. The following findings may be quoted:—

	No. of observations.	pH findings; mean and standard deviation.
<i>E. histolytica</i> present, actively motile.	25	6.35 ± 0.299
<i>E. histolytica</i> present, vegetative phase, but dead or dying.	22	7.30 ± 1.112
<i>E. histolytica</i> , cysts only found.	51	7.24 ± 0.253
Charcot Leyden crystals present, no amoebae seen.	54	6.96 ± 0.291

What is this acidity due to? Much further work is needed, and systematic observations are now being collected at the Calcutta School of Tropical Medicine by Dr. A. K. Dutt Gupta for analysis. By using a modified Conradi-Drigalski medium in which glucose is substituted in place of lactose, the incidence of infection with haemolytic streptococci in infections with *E. histolytica* has been studied. In the healthy carrier without symptoms, the normal faecal streptococci appear to be almost exclusively of non-haemolytic type.

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In the "carrier" with symptoms, however, and in the stools in acute amœbic dysentery a hæmolytic streptococcus of *anginosus* type is frequently found. Is it possible that invasion of the amœbic ulcers present in the carrier by this streptococcus may lead to the production of an acid environment especially suitable for *E. histolytica* and assist to convert the carrier state into that of actual dysentery? It is impossible to say; but the subject appears to demand investigation. In acute experimental amœbic dysentery in the kitten death is not apparently due to the dysentery itself. Extensive necrosis of the colon mucosa takes place, leaving large areas bare; pyogenic cocci invade the blood stream and the animal dies in a condition of extreme emaciation, apparently from septicæmia, rather than from the dysentery itself.

Whatever the facts, investigations are called for to determine the factors which convert the carrier condition into that of actual amœbic dysentery.

(6) It is now becoming increasingly clear that the so-called "healthy" carrier is not healthy at all. The extent of ulceration which may be present without accompanying symptoms may be very considerable. Musgrave (1910) and Bartlett (1917) record instances of quite extensive amœbic ulceration of the colon, unaccompanied by any definite symptoms. Armitage (1919)—quoted by Dobell—records a very interesting case of a patient who had never had any symptoms of dysentery but who was a constant carrier of *E. histolytica*; he acquired a typical amœbic liver abscess, and when this was cured, an amœbic abscess of the brain, from which he died. Acton and Knowles (1924a) record two instances of definite ulceration of some size in lascars on active service and on the active list. In brief the difference between the carrier state and actual amœbic dysentery is one of degree merely. Acton—(Acton and Knowles, 1924a)—records the finding of amœbic infection in such conditions as asthma, giant urticaria, neuritis of different types, sciatica, etc., where relief of the primary symptoms from which the patient complained followed the administration of emetine. It may well be that the ulceration present in the carrier state may permit of the absorption into the system of poisonous pressor bases, which in susceptible individuals may lead to symptoms; or even of hæmolytic streptococci in "showers" or at intervals into the blood stream. The ulcers of the amœbic carrier, in fact, may well constitute a source of "focal infection" just as important in tropical medicine as is a dental abscess or a suppurating antrum. Further, the carrier condition is notoriously difficult to eradicate; possibly secondary measures may prove to be of value; e.g., the administration of autogenous vaccines of any hæmolytic strain of streptococcus isolated from the stool.

In the investigation of the carrier state, and in assessing the extent of ulceration of the colon present, the value of a complete x-ray examina-

tion of the whole of the large intestine after a barium meal or bismuth enema is very great; often it will give one a clinical picture of the conditions present such as no other measure will provide. In the x-ray plates the diseased areas of the colon wall shew a mottling, sometimes—and particularly in old standing cases of amœbic infection—obstruction, due to old standing adhesions. The subject is dealt with in an admirably illustrated paper by Vallarino (1924).

(7) It is now becoming increasingly clear that in the majority of cases of infection of the colon mucosa, the liver does not escape. Clark (1924) records that of 186 persons who died from amœbic dysentery or its complications, no less than 95—or 51 per cent.—shewed major or minor amœbic lesions of the liver; solitary abscesses were present in 40 patients and multiple abscesses in 55; in fact it is now probable that amœbic abscess of the liver is not usually solitary—as is taught in the text-books—but more usually multiple. Sir Leonard Rogers (1925), comments on the frequency of hepatic cirrhosis in India. He states that the incidence of cirrhosis of the liver in 1,600 autopsies held in Calcutta was 5.01 per cent., as against a corresponding incidence of 1.3 per cent. for 1,000 *post-mortem* examinations held at St. Mary's Hospital, London. After a full discussion of the possible causes for this large excess in the Bengal figures, he concludes that it is mainly due, either to direct infection of the liver with *E. histolytica* and chronic irritation; or else to the absorption of poisonous principles from the gut in cases of amœbic ulceration of the colon. Further, the incidence of primary carcinoma of the liver appears to be definitely higher in India than in the United Kingdom, and chronic amœbic infection may possibly be one (of several) contributory causes.

Previously, the passage of *E. histolytica* from the ulcerated mucosa of the colon to the liver was regarded as an infrequent and unfortunate accident, usually leading to liver abscess. It is now becoming clear that in the majority of persons suffering from *E. histolytica* infection of the colon mucosa, repeated small infections of the liver take place. Probably, in the great majority of such cases, the amœbæ do no harm; the resulting disturbance in the liver is as slight as is that in the colon mucosa of the "healthy" carrier. Sometimes a mild grade of amœbic hepatitis—without abscess formation—occurs; more rarely actual necrosis of large areas of liver tissue, with resulting "liver abscess."

(8) It is stated quite definitely by Dobell (1919) that *E. histolytica* never encysts in the liver. Thanks to the introduction of emetine by Sir Leonard Rogers, pathological material for a study of this question is now exceedingly difficult to obtain, even in India. But a striking paper by Boyers, Kofoed and Swezy (1925) of the California University department of protozoology deserves the attention of everyone interested in the subject of amœbiasis. These

workers commenced to institute duodenal drainage with the duodenal tube in all patients shewing intestinal infection with *E. histolytica*; and carried out in all 120 such duodenal drainages on 50 patients. The duodenal fluid was passed in each instance into a series of flasks containing Bouin's fixative, and the contents of the flasks then centrifuged, and the deposit smeared into films, stained and examined. In 11 out of these 50 patients, *E. histolytica* was discovered in the contents of the duodenal drainage (a) in its vegetative and motile phase, shewing active pseudopodial activity and clearly viable; (b) vegetative forms which were clearly degenerating and dying; and (c) cysts at all phases up to the mature tetranucleate stage.

This paper is almost revolutionary. In the first place the authors' figures very clearly shew that what they discovered was *E. histolytica*, and not something simulating it. Hitherto it has been believed that encystment of the intestinal entamoebæ was a response to biological necessities on the part of these parasites; as they are about to escape from the patient into the outside world where they will be exposed to adverse conditions, encystment occurs in order to carry over the life of the parasite from one host to the next. Boyers, Kofoed and Swezy, however, point out that among the free-living amoebæ encystment is not always and necessarily a response to adverse conditions; in a culture where conditions are entirely favourable and the amoebæ are growing vigorously, a phase of encystment may occur, apparently in order to give the amoebæ an interval of rest from active life. Is it possible that the same thing may occur in *E. histolytica* infection of the liver; that the entamoebæ may encyst within the liver tissue, and so pass into a state of quiescence which will tide them over long intervals of time? It is possible that encystment occurs in the bile ducts rather than in the liver tissue, but the very suggestion that *E. histolytica* may encyst within the tissues is very disturbing. The phase of encystment is exceedingly intractable to treatment and one can hardly conceive of any drug which could affect a cyst of *E. histolytica* lying in the liver tissue.

We have seen that there is a possibility of latent phases of *E. histolytica* infection in the lumen of the colon; of periods when cysts may lie dormant in the colon and thereafter de-encyst in the same situation. If the matter is to be complicated by phases of encystment within the tissues, it becomes even more difficult to deal with. (One might even go further and postulate that fantastic "vicious cycles" exist; the liver becoming infected by vegetative forms from the colon mucosa, and the colon mucosa becoming re-infected by the de-encystation of encysted forms derived from the hepatic infection!)

The importance of the issue raised by Boyers, Kofoed and Swezy is very considerable. Further investigation of the subject is urgently needed.

(9) The School of Protozoology of the

California University, however, have not been content to leave matters even at this stage. Theoretically, once escaped from the ulcerated mucosa into the portal blood stream, there seems no reason why it should not get to any organ or tissue of the body, settle down there, and cause localised disease. On the other hand, in Sir Leonard Rogers' extensive study of the records of 1,600 *post-mortem* examinations held in Calcutta, whilst the frequency of amoebic infection of the liver is clearly recognised, amoebic infection of other organs appears to be very rare indeed. Carey Evans (1926) records "several cases" of amoebic abscess of the spleen as having been reported in the literature;—he does not say how many. Cerebral amoebic abscess is commoner, but even this is a great rarity; Carey Evans states that it is never primary, but always secondary to amoebic abscess of the liver.

Amoebic abscess of the lung is usually secondary to amoebic abscess of the liver, and usually represents a direction extension of the infective process from the right lobe of the liver to the base of the right lung through the diaphragm. But numerous instances are now on record in the literature in which primary infection of the lung appears to have occurred without infection of the liver. Thus in this journal Shanks (1926) records a case where ulceration of the colon co-existed with an amoebic abscess of the lung, but where the liver appeared to be quite unaffected. Very numerous papers on this subject have appeared in the literature during recent years; but not many in which the diagnosis of *E. histolytica* present in the sputum with no accompanying symptoms of hepatic disturbance can be said to have been confirmed. Causeade and Tardieu (1925) record an interesting case where a patient had a solitary amoebic abscess in the lower lobe of the right lung, together with an entirely independent abscess in the liver. One may conclude that primary infection of the lung may occur—without obvious involvement of the liver, but much clearer evidence than has yet been forthcoming is wanted before one can recognise primary pulmonary amoebiasis as an established fact. The fact that the common entamoeba of the mouth—*Entamoeba gingivalis*—may be present in the sputum and may be mistaken for *E. histolytica* by an inexperienced worker, adds to this problem.

Extension of the amoebic ulceration of the colon to the bladder can be readily understood. Here again there are innumerable instances in the literature of "urinary amoebiasis," and the subject has recently been reviewed by Fiessinger and Parturier (1926). In many of these instances it is certain that macrophages in the centrifuged urinary deposit have been mistaken for amoebæ. Walton (1915) however records a clear case where undoubted *E. histolytica* were present in the urine. It seems to be certain that *E. histolytica* may occasionally reach the mucous membrane of the bladder via the blood stream;

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may settle in such a site and cause urinary symptoms.

Warthin (1922) goes further, and records infection of the testis and epididymis. The patient was a Russian Jew with a history of syphilis and of old standing dysentery who finally died in hospital from pneumonia. The stools shewed typical *E. histolytica*. At post-mortem examination small erosions were found in the rete testis and the tubuli efferentes, with long streaming clots extending into the epididymis and vas deferens. In these clots vegetative forms of *E. histolytica* were found, with included red blood corpuscles, and some of them shewing phagocytosis of spermatozoa. The erosions appeared to have been caused by the entamoebæ, as they were found at the base of the clots where they were adherent to the walls of the ducts and the epithelium at these sites was eroded. Warthin's paper is chiefly supported by his microphotographs, which certainly appear to shew vegetative forms of *E. histolytica* lying *in situ* as described.

Kofoed, Boyers and Swezy (1922), however, go further still. They believe that they have found vegetative forms of *E. histolytica* in the enlarged lymphatic glands of Hodgkin's disease, and they trace a causal relationship between *E. histolytica* and Hodgkin's disease. The stools of the patients examined all shewed *E. histolytica* infection of the colon. Further, Kofoed and Swezy (1922) believe that they have found the vegetative forms of *E. histolytica* in material from a diseased femur in a case of "Ely's second type" of arthritis deformans: i.e., of non-bacterial origin. In both findings they depended on the appearances noted in sections. Certain cells which shew (a) the persistence of the nuclear membrane during division of the cells; (b) an "intradosome" present during mitosis, in place of the centrosome present in division of a metazoal cell; and (c) chromosomes which number 6, whereas the normal number for the human tissue cell is 24, are claimed to be *E. histolytica* and not human tissue cells. These workers do not appear to have studied fresh material for motile *E. histolytica* in such lesions; or—indeed—to have had access to such material.

If we are to accept the conclusions put forward by these workers, our conceptions of amœbiasis will have to be revolutionised. We must conceive of *E. histolytica* as a parasite, usually present in the mucous membrane of the colon, as capable of invading the blood stream—as we know that it does,—but also capable of settling down in and infecting almost any and every tissue of the body; of causing almost any train of localised or generalised symptoms.

The foundations for such a view are scanty in the extreme. Not one of these workers appears to have identified motile, vegetative *E. histolytica* in fresh preparations of the supposedly infected tissues. Their views are contested by W. M. James (1925), an experienced worker on the human entamoebæ, who writes as

follows:—"It is plain to me that (amœbic) intestinal ulceration, such as we see under the microscope, cannot be expected to heal within two or three weeks. I should think that a period of two or three months would be required for repair and healing. I have no method of knowing how long it takes the tissues to conquer the amœbic invasion, and for that reason I think that treatment should be prolonged. I still remain unconvinced that amœbiasis is a genuine systemic infection,"—the italics are the author's—"to date, the school of investigators who support this opinion has presented nothing to modify my views. Any lesion in a tissue that is to be considered of amœbic origin must shew amœbæ as entire parasites beyond any possibility of doubt. The diagnosis cannot be established on the basis of nuclear structure alone."

"It is of great interest to me to learn through a recent letter from Professor Dobell that he has revised his opinion that *E. histolytica* is always a tissue parasite. He is now convinced that it can occur in the large intestine without tissue penetration. In other words, a latent infection does not necessarily mean ulceration of the bowel, but it is capable of establishing an ulcerative process at any time."

The present writer—at least—concurs with the above quotation. The Californian workers regard infection with *E. histolytica* as being as protean in its symptomatology as is syphilis; it may cause any lesion from an iritis to a condition of arthritis deformans. Hodgkin's disease and amœbic dysentery do not present any obvious causal connection to the ordinary medical practitioner in the tropics. Yet there must be many workers in pathological laboratories in India to-day who are both conversant with *E. histolytica* in its active, vegetative phase, and capable of identifying it with certainty; and who are also in touch with fresh post-mortem material. The issue raised is so considerable that it demands investigation. If such a thing as "amœbic septicæmia" exists, it should not be difficult to prove its existence; if—as seems more probable—it does not exist, negative evidence can be accumulated against the suggestion. If *E. histolytica* be frequently present in the duodenal contents of persons who shew infection of the colon, it ought not to be difficult to find it where material is available. The matter awaits the attention of those who are in a position to investigate it.

In the meantime the view of the Californian School of protozoologists that such a condition as amœbic septicæmia exists cannot be accepted until further evidence is forthcoming. But it is, none the less, an interesting suggestion.

It will be seen that we have travelled a considerable distance since the termination of the Great War.

R. K.

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HEREDITY AND MENTAL DISEASES.

A MELANCHOLY interest is associated with the number of the *British Medical Journal* of June 19th, 1926; it contains the report of a Chadwick Lecture, on heredity in relation to mental disease and mental deficiency by Sir Frederick Mott, and also the obituary notice of the distinguished author. The lecture is an important contribution to the problem of insanity and mental deficiency. Sir Frederick opened his lecture by asking whether the increase in the number of registered cases of insanity is due to a raising of the standard of mental efficiency so that persons are now detained in asylums who would formerly have remained at liberty, or whether there is a real increase in the number of insane persons. Assuming that there is a real increase in insanity, is this due to interference with natural selection whereby poor types are weeded out? Or is it due to such causes as alcoholism, syphilis or infectious diseases like lethargic encephalitis? One undoubted reason for the increase in the number of the insane is the fact that lunatics are much better cared for than formerly so that their length of life has been considerably increased. In considering the influence of heredity it is necessary to eliminate such forms of insanity as are due to general paralysis, and other non-inherited diseases and it is exceedingly difficult to draw a sharp line of distinction between the inherited and non-inherited forms of insanity. Sir Frederick held that most asylum patients suffer from transmissible insanity. He stressed the fact that the brain is the material basis of mind: the brain functions depend partly on inherited

structure, partly on training and partly on the quality of the blood supply. The absence of iodine from the water supply may be a fruitful source of mental deficiency as is shown by the prevalence of continuous idiocy in certain places and by the reduced prevalence of that disease when iodine has been added to the drinking water.

Reference was made to the work of Professor Starch who estimated 60—70 per cent. of mental character and disposition as due to heredity, and only 10—40 per cent. to environment and training. It is interesting to note that enquiries made by Miss Agnes Kelly under the direction of Prof. Mott showed that insanity was present in the pedigrees of 50 per cent. of insane persons and only in 25 per cent. of mental defectives, while in the case of mentally defective children there were far more cases of mental deficiency than of insanity in the ancestors. Normal children showed a family history of insanity or mental defect in a very small percentage of cases. In other words the truism that "like tends to beget like" is found to hold good in the case of insanity and mental defect. Mental activity is closely associated with the degree of development of the grey matter of the brain, in idiocy and imbecility the number of cells of the grey matter is usually much diminished by arrested development.

In dementia due to syphilis the destruction of well developed brain cells by the spirochæte of syphilis is responsible for the faulty working of the brain.

Among primitive races mental deficiency tends to be eliminated by the struggle for existence whereas in civilized communities altruism and pity tend to perpetuate the defectives. The forms of insanity which are most liable to hereditary transmission are involuntal melancholia, manic depressive insanity and dementia præcox.

The question is raised whether it is advisable to waste public money in the vain effort to educate mental defectives at a high cost instead of arranging for their employment on simple handicrafts of which they are quite capable. Colony life from an early age is recommended so that they may not be a nuisance to the community.

In the case of the high-grade imbeciles and moral imbeciles compulsory segregation is more difficult, but in large towns the immoral imbecile

female frequently contracts venereal disease because of her habits and so becomes unfruitful.

Evidently there is something to be said even for venereal disease and alcohol: both of these help in the elimination of the unfit and the pity is that they cannot be restricted to such beneficent activities. A very important point is raised in the lecture; the migration of the rural population to the larger towns causes a drain of the better types of men and women from the land so that there is an increasing percentage of mental defectives and insane in the rural areas.

It is argued that steps should be taken to encourage the better types to remain on the land; if nothing is due to improve the conditions of workers on the land a steady further deterioration of the race must ensue.

When we read this paper by the late Professor Mott we cannot help feeling a very deep sense of the loss that has been sustained in his death while he was still capable of such valuable contributions to the very important subjects of insanity and mental defect.

J. W. D. M.

SPECIAL ARTICLE.

A STUDY OF THE RESULTS OF THE APPOINTMENT OF A PUBLIC HEALTH STAFF IN A RURAL AREA (KHULNA DISTRICT).

By BIJOY CHANDRA MUKHARJI, M.B., D.P.H.,
Assistant Director of Public Health, Presidency Circle,
Bengal.

A study of the yearly toll of cholera in the district of Khulna is interesting. The figures given in Table I show the decline in the cholera mortality in the district in recent years. This is the result of a systematic campaign against cholera declared by the District Board in 1920, when in October a District Health Officer was appointed. There had previously been only one sanitary inspector from August 1913 until 1920. Soon after the appointment of the Health Officer, two more sanitary inspectors and three epidemic doctors were appointed. In view of the fact that coolies are not available at most places for carrying medicines and disinfectants to cholera infected villages, the District Board appointed a cooly peon for each of the Sanitary Inspectors and epidemic doctors. The District Board appointed additional establishment during heavy epidemics and was often helped by officers deputed by the Public Health Department. Voluntary organisations have also worked in co-operation with the District Board in quelling cholera epidemics. As a result of the steps taken, there was a big drop in the cholera mortality in 1921. This is shown in Table I.

TABLE I.

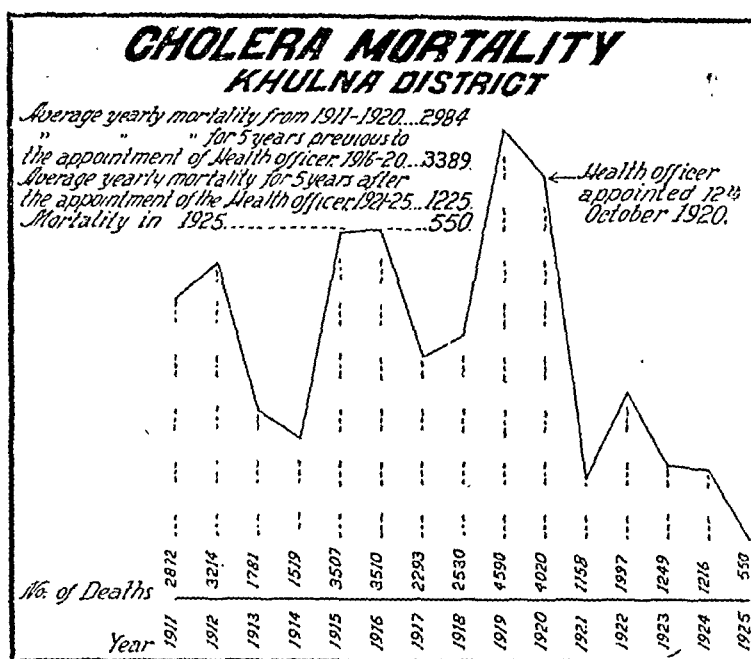
Rainfall and Cholera Deaths in Khulna District.

Year.	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
Annual Cholera Mortality	3,507	3,510	2,293	2,530	4,590	4,020	1,158	1,997	1,249	1,216	550
Annual rainfall inches ..	..	..	71·89	79·81	63·84	65·93	58·69	167·40	62·09	78·7	68·48
Cholera Deaths per mille.	..	..	..	..	..	..	0·869	1·398	0·875	0·855	0·38

Census population of 1911 .. 1,362,416

Census population of 1921 .. 1,453,034
Health Officer appointed on 12th October, 1920.

placed in prominent places in the villages and leaflets containing instructions for stamping out cholera were distributed broadcast. These measures had a twofold effect. (1) They kept freshly in the memory of the



The average recorded yearly deaths for the quinquennium of 1916-20 was 3,389. The average yearly deaths from cholera for the quinquennium of 1921-25 (i.e.,

Vital Statistics in Khulna District.

Year.	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
Total Deaths ..	40,198	39,678	34,930	45,750	56,560	48,233	37,472	35,302	34,146	34,978	34,437
Fever Deaths ..	..	24,147	21,337	38,980	38,572	34,579	27,010	23,578	23,623	24,337	24,444
Smallpox death-rate per mille.	..	..	..	..	0·1	1·23 smallpox epidemic year.	0·024	0·014	0·013	0·005	0·058 smallpox epidemic year.

Health Officer appointed 12th October, 1920.

after the appointment of the health staff) was 1,225. The comparison (3,389:550) shows a reduction of cholera mortality by 83 per cent. in 1925. Again, by comparing the average yearly mortality from cholera for the quinquennium before the appointment of the health staff with that after the appointment (3,389:1,225), the result may be shown as a saving of 10,820 lives from 1921 to 1925 from cholera alone. Table II shows the total mortality in the district for the past ten years.

TABLE III.

Mortality rate per mille in Khulna district.

Year.	Birth rate per mille.	Death rate per mille.	Cholera rate per mille.	Fever rate per mille.	Smallpox rate per mille.	REMARKS.
1919 .. ..	....	....	3.36	....	0.1	
1920 . . . .	....	....	2.75	....	1.23	Smallpox epidemic year, 1920.
1921	31.7	27.4	0.869	23.93	0.07	
1922	30.1	24.5	1.398	16.589	0.014	
1923	30.5	23.49	0.878	16.621	0.013	
1924	31.15	24.07	0.855	17.82	0.005	
1925	30.98	23.70	0.38	16.82	0.058	Smallpox epidemic year, 1925.

The increased fever rate from 1923 is due to kala-azar.
Health officer appointed 12th. October, 1920.

The rise in fever mortality and general mortality in 1924 and 1925 is explained by the spread of kala-azar, which was almost unknown in Khulna before 1920. A programme of work against the spread of kala-azar and malaria has been launched and its results are being keenly watched by the District Board. In 1919 and 1920 there was the influenza epidemic. The high death rate of those years was due to influenza. However, the deaths recorded in 1925 were less than those recorded in 1916 and 1917, when there was no influenza. The death rate per mille is steadily falling. The vigorous steps taken by the District Board in promoting vaccination in the district has caused a fall in the mortality from small-pox to only 8 deaths in 1924. The outbreaks of epidemic dropsy, Vincent's angina and diphtheria in the district have been successfully controlled.

Although there are more births than deaths in the district and the population has increased from 1,362,416 in 1911 to 1,453,034 in 1921, the infant mortality is still very high, and it is hoped that the District Board will shortly adopt schemes for bringing down the infant mortality. It is to be realised that the warfare with epidemic disease has to be prolonged and constant. Any cessation of the work that is being done will only cause a reversal to the old state of affairs, which was undoubtedly much worse than the present. For the prosecution of the work, the appointment of a fully trained staff is necessary.

The District Board chairman takes a delight in saying that at least 10,000 lives have been saved from cholera alone by the appointment of the health staff. For the small expenditure incurred by the appointment of a health staff the District Board has had good returns. Mr. Lang, Commissioner of the Presidency Division remarked in his report on the working of the District Boards during the year 1920-21. "The Health Officers appointment is still too unpopular with the District Committees. In time they will realise as in Khulna, that he can be a power for good. Much will depend on the man."

Current Topics.

The London School of Hygiene and Tropical Medicine.

MANY medical men in India will be interested in the scheme for a large new School of Hygiene and Tropical Medicine in London, which will incorporate

the previous London School of Tropical Medicine as the Tropical Division of the new institution. The foundation stone of the new building, which will probably take some two years to construct, was laid by Mr. Neville Chamberlain, Minister for Health on July the 7th 1926. Considering how great a part the late Mr. Joseph Chamberlain took in the creation of the former London School of Tropical Medicine, it was singularly appropriate that his son should lay the foundation stone of the new building.

We take the following abstracts from the account of the new School in the *British Medical Journal* for the 10th July, 1926, p. 75.

More than five years ago a committee was appointed by the Ministry of Health to investigate the needs of medical practitioners for further education in medicine in London. In May 1921 a report was issued advocating the establishment of a post-graduate medical school in London, and also of an Institute of State Medicine, both to be in association with the University of London. An expert committee, of which the Minister of Health was chairman, was appointed to consider the recommendation as to an Institute or College of Hygiene: the chief difficulty in the way of its realization was financial. The matter was placed before the Rockefeller Foundation, and in February, 1922, the Rockefeller Trustees generously offered two million dollars (£400,000) towards the cost of building an Institute or School of Hygiene in London on the understanding that the British Government would accept the responsibility of providing for the staffing and maintenance of the school when established; the cost of this was estimated at about £25,000 a year. A second donation of £4,000 yearly was subsequently promised by the Rockefeller Trustees to provide for the payment of a director and an administrative staff charged with the duty of making all necessary preliminary arrangements regarding the building and the scope of its work. Dr. Andrew Balfour was accordingly appointed Director at the end of October, 1923. During the long period that has

elapsed since the original decisions were taken we have referred more than once to the great importance of the principles underlying this project, and we therefore welcome the opening of the last stage in the creation of an institution which will, we believe, have a powerful influence on the development of scientific hygiene and preventive medicine in the British Empire and beyond.

Provision had to be made for teaching hygiene in all its branches, for instruction in tropical medicine, and for research work in both these subjects and in any of the ancillary sciences. The balance had to be maintained equally between teaching and research. Both are essential, both are important, and careful and sympathetic consideration had to be given to both. As a result, it was decided to provide for research one-sixth of the total space available for instructional purposes. This may be regarded as a liberal allowance when it is remembered that the space devoted to teaching includes a big lecture theatre, numerous roomy classrooms and general laboratories, a library, a very large museum on two floors, tutorial rooms, and other accommodation. The number of students which the School is intended to accommodate is 250. Of these, it is considered that 100 will be engaged upon the study of tropical medicine—a figure based on the present attendance at the courses given in the Tropical Division at Endsleigh Gardens, where there has of late been an average of nearly seventy each session. The remaining figure, 150, representing students studying for diplomas or degrees in public health, has intentionally been placed very much on the safe side. At present there are only about forty-five students attending courses in London for the diploma in public health, but it is noteworthy that a recovery has taken place from the marked fall in numbers which followed the introduction of the new regulations of the General Medical Council, and there seems little doubt that this increase will continue, although it may be many years before there are as many as 150 aspirants for a public health qualification.

Meanwhile, however, the space provided will not be wasted, for there is likely to be, before very long, a surplus of research workers who can occupy to good effect some of the accommodation for ordinary students. If by the time that more accommodation is required for teaching purposes it becomes necessary to add to the size of the School this could be done, as care has been taken to see that its foundations and walls can carry another story.

The provisional scheme of studies provided for six main divisions—namely, those of Applied Physics, Physiology, and Principles of Hygiene; Chemistry and Biochemistry; Immunology and Bacteriology; Medical Zoology, including Parasitology and Comparative Pathology; Epidemiology and Statistics; and finally, the Principles and Practice of Preventive Medicine, General Sanitation, and Administration. This grouping has been retained, but, in addition, the fact that the clinical pathology of exotic diseases forms a most important part of tropical medicine has been recognised, and a special laboratory has been devoted to the joint needs of this subject and of certain branches of tropical hygiene, with which, of course, tropical pathology is intimately associated.

The London School of Hygiene and Tropical Medicine is to be congratulated on the happy combination of Dr. Andrew Balfour and nearly half a million pounds generously granted by the Rockefeller Foundation.

The third condition which is essential to the completion of the great scheme is an adequate provision for staff and upkeep. The British Government has undertaken responsibility for this, so that the success of the school is assured.

It is remarkable that the wealthy and powerful Government of Great Britain . . . accept the help of the Rockefeller . . . the Government of India has not yet invited the Foundation to investigate the pressing needs of this vast country.

The Principles of Treatment of Pulmonary Tuberculosis.

By CLIVE RIVIERE, M.D. (Lond.), F.R.C.P.

(*British Med. Journ.*, May 1, 1926, p. 771).

THIS paper contains an excellent resumé of modern practice in the treatment of pulmonary tuberculosis which Riviere regards as one of the most curable of infective diseases. Many of us have weathered it in its slighter forms, with proper treatment. The reasons for so large a death roll lie in the neglect and ignorance which delay the diagnosis, while impatience and lack of opportunity prevent treatment being carried through to a cure.

Pulmonary tuberculosis needs for its cure the years that are given to the treatment of surgical tuberculosis and without them failure must follow.

The first essential in the treatment is "rest." Let the patient be put at rest—preferably in bed—as soon as the disease is diagnosed, or even before. Open air should be as complete as possible, and the patient must be inured to it gradually. In particular, it is to be insisted that the patient be exposed to full daylight, unobstructed by glass. This is a very important element in open air treatment, but direct sunshine, unless the air is cold, is safest avoided by patients with active lung disease. The effect of open air, and especially of cold air breathed, seems to be a stimulation of metabolism, leading to increased appetite and well being. Climate is secondary to open air, but is of more value than is sometimes admitted in this country. Tuberculous patients do best in a dry climate.

There is universal agreement that cases decidedly febrile must be kept at rest as long as fever persists—beyond that point differences of opinion and practice exist. On the whole it may be said that Continental sanatoriums advocate rest, rather to the avoidance of exercise, while British institutions enforce less rest and make exercise a part of their routine. The tuberculous patient is an unconscious vaccine therapist. When he exercises he receives a dose of autotuberculin, and when he rests the dosage is reduced. Thus the treatment of tuberculosis demands above all some knowledge of the action of tuberculin and of the means whereby it can be turned to therapeutic use.

If an effective dose of tuberculin is given to a tuberculous patient it is followed, after an interval of eight to twenty-four hours, by a "reaction" corresponding to the negative phase. At the point of injection there may be a "local reaction," with redness and swelling; a "general reaction" is shown by fever, malaise, and perhaps headache; and a "focal reaction" occurs in every active tuberculous focus. It is this focal reaction which especially concerns us. Each area of disease becomes flooded with blood, and this leads to an increase of physical signs, and of symptoms such as increased cough and sputum. If the dose has not been excessive all these symptoms may quickly clear and a positive phase of immunity may follow. If, however, the focal reaction has been severe, and has occurred in areas of very active disease, other phenomena may follow. Further, toxins and bacilli washed out may lead to further, "secondary" reactions, both general and focal, with corresponding prolongation of fever and illness, and these may continue and increase owing to further spread of disease and increased sensitiveness to tuberculin. This gives us the picture of autotoxic tuberculosis brought about by neglect of treatment.

If the dose of tuberculin has been moderate and followed by a mild reaction, it will be found that a period of increased "tolerance" to tuberculin ensues. During this period a larger dose will be tolerated, and by giving a gradually increasing dose at the best interval, which is found to be about twice weekly, we can establish tolerance to very large doses. The same can be accomplished with auto-tuberculin on a system of graduated exercise.

If the patient is ill and febrile we know he is overdosed with tuberculin from the diseased lungs. With

complete bodily rest the auto-tuberculin reactions die down and the patient becomes afebrile and free from symptoms. But the disease is still active—get the patient up and fever again appears.

After an interval for the tissues to recover their lost balance it will be found possible by a graduated regime to bring the patient back stage by stage to active movements without any fever resulting and even with a steadying of temperature. With each step forward it may be found that the temperature shows a slight rise, or an increase of the diurnal fluctuation, but these after a short time again subside. Finally the patient, with disease which is far from being arrested, may yet be following a vigorous regime without any untoward symptoms—thanks to this tolerance. But if tolerance is upset at any point by too rapid rise of dosage violent reactions may occur and a period of rest be again required.

In disease of chronic fibroid, "proliferative" or "productive" type, mild reactions and a full blood supply seem in many cases to promote the healing of disease. But in cases of acute, caseous, or "exudate" type both reactions and congestion may lead to softening of caseous areas, and though in the neck glands this may be of little consequence, in the lungs it is a serious matter, for it leads to cavitation.

No patient with caseous areas of any extent should exercise till the disease is fully quiescent; and since most cases of tuberculosis are of mixed type and contain some areas of caseous disease, exercise should be regarded as a somewhat dangerous measure in pulmonary tuberculosis until all evidence of activity is past.

If there is fever, rest in bed must be carried on, under open-air conditions, until all fever has gone, and as long after as symptoms and signs suggest that disease may still be active—for activity is not limited to the period of fever. Where fever continues in spite of rest in bed, this must be continued in the hope that eventually it will subside, which it may do after even three or four months or more of waiting.

The possible need of collapsing the lung in such a case by artificial pneumothorax must not be neglected till too late. As long as fever persists rest is the one essential of treatment, and such a patient may be better nursed in his own home, if conditions are suitable, than in a sanatorium. Six or more months' rest is not a bit too much for a case of serious type.

Cases with little or no fever will require less in the way of strict rest, but at the outset a period of bed, and later bed and couch or lean-chair, will be needed.

When the disease is arrested the patient should be got slowly but steadily back to normal exertions, and five to eight or ten miles' walking exercise daily is not too much to end up with. But this must be slowly and steadily achieved, with an eye on the temperature chart; any rises of temperature must be met by a return to a more resting regime. It is especially during this stage that the sanatorium is of unique value, providing as it does the skill of a physician specially trained in this difficult work. At the same time that exercise is being steadily pushed to these moderate heights the patient must have some hours of complete rest on couch or lean-chair during the day, and for some part of this time should relax his muscles and do nothing, or sleep if he will. On the Continent at least seven or eight hours' daily rest is the rule. For localized tuberculosis, as in surgical cases, where there is little or no auto-inoculation, tuberculin can be used in small doses, repeated with the same response every two weeks, by which time tolerance will have dropped again. But in autotoxic tuberculosis, as in lung cases, where inoculation with auto-tuberculin already occurs, it is found better to raise the dosage steadily at a shorter interval and so establish tolerance. Doses are started in the neighbourhood of a millionth to 100,000th of a cubic centimetre, and rise steadily, by geometric progression, to a final dose of 1 c.cm. There is no doubt that a well applied course of tuberculin does good in suitable cases, but the treatment has gone out of fashion here largely on account of the trouble involved to both doctor and patient. If it is used, my

advice is that large reactions should be avoided—that getting a minimum but definite response to each dose should be aimed at. Any marked reaction must be met by rest and the return to a lower dose at the next injection. The treatment is not suitable for febrile cases, nor for "exudative" types of disease. It is useful in those quiet chronic types for which graduated exercise may be employed with impunity or even with advantage.

The tuberculins on the market are very numerous, but their actions are very similar; the best known are Koch's three preparations—old tuberculin, new tuberculin or T. R., and bacillus emulsion or B. E.

In 1924 Moellgaard of Copenhagen published a book on the chemotherapy of tuberculosis. He had produced a preparation named "sanoerysin," a double thio-sulphate of gold and sodium, which, he claimed, would diffuse through the non-vascular tuberculous tissues, penetrate the fatty capsule of the bacillus, and attack it *in situ*. Intravenous injections of this body in 4.5 to 5 per cent. solution led to violent reactions, often with erythema and albuminuria, and in some cases "shock" symptoms, and these have been ascribed, as they may well be in part, to the mobilization of auto-tuberculin. A serum has been used with the hope of neutralizing these toxic effects, but it appears to be of doubtful utility. Various results, some good and some bad, have so far been attained, and the method is still under trial.

There is the sodium morrhuate treatment, introduced by Leonard Rogers, the substance injected being a sodium salt of the unsaturated fatty acids of cod-liver oil after extraction by ether. Lastly, there is colloidal calcium. It is curious that these substances should produce reactions very similar to those produced by tuberculin, but so it is, and in certain cases, as happens with other methods of auto-inoculation, a certain measure of improvement follows. Whether with any of these measures the results justify the means, or whether they present any definite advantage over the "controlled auto-inoculation" produced by suitable rest and exercise, is a question difficult to answer. Certain it is that no striking results, unobtainable by other means, have ever been demonstrated.

Pneumothorax as a form of treatment is recognised as a most valuable measure all the world over. The cases for which it is suitable are (1) cases of active disease which strict recumbency has failed to arrest, and where more complete rest of the lung is needed. (2) cases where cavitation and extensive disease have rendered healing impossible in the extended lung. (3) recurrent hæmoptysis. The disease must be, in the main, one-sided, or if disease is present in the better lung it must be of quiet type and not too extensive. Much experience is needed to decide what is a suitable case, but in a doubtful case an artificial pneumothorax can be tried and its effects watched.

After the first few fillings there is often an increase of fever, and as the lung collapses its contents are squeezed out and appear as an increase of sputum. But in a short time, in a successful case, the sputum again diminishes or disappears, the fever wanes, and the patient rapidly reaches a condition of "clinical recovery." But the diseased lung, though removed from view and no longer, thanks to the stagnation of its lymph and blood supply, providing poisons, will need a long period to reach "anatomical recovery." This takes place by an active fibrosis throughout the organ, and treatment can generally be given up after some three or four years. The lung's re-expansion will then depend on the extent of disease, and is often pretty complete unless it is bound down by a thickened pleura resulting from pleural attacks during treatment. Pleurisy is a common complication of artificial pneumothorax, and attacks, generally in a slight form, fully 50 per cent. of cases at some time during treatment.

The main trouble in pneumothorax treatment is the very common presence of pleural adhesions, which tend to limit collapse.

For those cases where pneumothorax treatment has failed owing to adhesions, there remains still the

possibility that the diseased lung may be collapsed by suitable surgical measures.

The modern operation is a paravertebral resection of ribs. Portions of all the ribs, from the first to the tenth or eleventh inclusive, are resected through an incision running down the back over their angles. The aim is to obtain a satisfactory collapse of the thorax, and for this it is necessary to cut the ribs back to the transverse vertebral process, and especially to include the first rib so that the ribs may fall like the handle of a bucket.

The results of these operations in skilled hands have been highly encouraging, but they can only be performed with advantage in carefully selected cases.

In hæmoptysis the first point is to allay anxiety and instil confidence. Morphine should be avoided, especially if the hæmoptysis is large, or at most given in small doses. Better is a large dose (30 to 60 grains) of sodium bromide. The patient is best propped in the semi-upright position, so that coughing is easy and told to restrain too violent or needless cough.

Cough.—Cough is in some cases a troublesome symptom, in that it disturbs healing of the lung and increases auto-inoculation. The patient must learn to restrain it, and with practice may do much. Often it is easier if rendered looser, especially by that useful drug ammonium chloride. Opium preparations should be postponed as long as possible—they soon upset general well-being. Lozenges containing demulcents, as liquorice and perhaps some menthol, will often suffice, or for some patients an occasional inhalation containing menthol, creosote, and chloroform.

Rheumatic Heart Disease in Children.

(Supplement to the *British Medical Journal*, July 3rd, 1926).

A SUB-COMMITTEE of the British Medical Association has published a report on this very important subject. Although rheumatic heart disease is much less common in India than in England it appears to have a wide distribution in this country and the findings of the sub-committee will be read with interest.

Four reports were submitted by the committee. The first by Dr. Reginald Miller deals with the environmental predisposing causes of rheumatic infection. Evidence is produced that the disease flourishes specially (1) in cold and damp places, (2) in industrial as opposed to rural areas, (3) in the poorer as opposed to the richer classes.

Heredity is usually regarded as an important factor, but Dr. Miller is doubtful as to whether it plays any great part in the causation of the disease.

Damp houses show more cases than dry. There is a strong suspicion that school life predisposes to rheumatism but the disease is rare in private and boarding schools though very common in elementary schools.

Malnutrition predisposes to the disease but its action is not so obvious as might be expected.

The second report by Dr. Carey Coombs and Dr. Poynton deals with the bacteriology of the infection. Many recent workers have failed to cultivate any organisms from the blood, others have isolated streptococci in a large percentage of cases.

Although Dr. Poynton discovered the streptococcus which he suspects to be the cause of acute rheumatism, his summing up of the situation is studiously fair. It may be taken that a streptococcus of the same group as *S. salivarius* is the most likely causal organism.

Dr. Reginald Miller reports on the effect of tonsillectomy on rheumatic infection of children. All workers admit that disease of the tonsils is far more frequent among rheumatic than non-rheumatic children, indeed it is only a small minority of rheumatic children that is free from any signs of tonsillar disease.

The effects of tonsillectomy are not easy to estimate, most authorities agree that the operation does no harm

but others suspect that it causes an increase in the liability to rheumatic disease. Dr. Miller produces evidence that tonsillectomy if early carried out causes a diminution in the incidence of sore-throat, pains, arthritis and carditis but not of chorea.

In most rheumatic cases the tonsils usually continue to be affected in a chronic manner if they are not operated on and the suggestion is that they persist as foci from which the rheumatic infection is maintained. For this reason early tonsillectomy is advised. In each case all the circumstances have to be carefully considered and expert advice is always desirable. The report on the organized after-care of rheumatic children is by Dr. G. A. Allan and Dr. A. P. Thomson. Details are given on the provisions which are made by various corporations. The report is concluded with an extract from a report by the Chief Medical Officer, Board of Education (1924) on "The Health of the School Child."

Suggested Lines of Action by the Local Education Authority.

"1. The school medical officer should establish a register of all the children suffering from the principal manifestations of rheumatism (cardiac disease, chorea, and arthritis).

"2. Those in charge of such children, parents and teachers, should be informed of the significance of the disease and its early symptoms. The dangers of neglecting 'growing pains,' sore-throats, the early signs of chorea, etc., should be impressed upon them. The fact that damp rooms, damp boots or clothes may predispose to rheumatism can often be usefully explained. School premises should be kept free from damp, and there should be provision for drying the clothes, and especially the boots, of children who arrive at school wet.

"3. Exclusion from school or otherwise should be determined by the nature of the disease, the state of the patient, and the condition of its home life and circumstances.

"4. There should be medical and surgical treatment suited to the case, in school, home, clinic, or hospital, and particular care should be taken to remove any focal infection in teeth or tonsils.

"5. The school medical officer should also advise in regard to the home and social environment of the rheumatic child, its after-care, its upbringing and employment.

"There can be no doubt that children suffering from rheumatic infection are better for early hospital treatment, and there is need for more institutional accommodation for such children. Preferably they should be dealt with in separate open-air hospitals or residential recovery schools, where 'team' and co-operative research can be undertaken into differential diagnosis and causation, and where suitable treatment, training of the body, education of the mind, and prolonged convalescence are available. Something much more than the ordinary convalescent home is necessary."

If we accept the evidence that rheumatic infection enters by the tonsils and so is a droplet infection, it is difficult to understand why attention is not focussed on the extreme importance of preventing the invasion of the upper respiratory tract in the first instance, rather than on such unsatisfactory palliatives as dealing with the tonsils after they have become diseased or giving special attention to children with damaged hearts.

It is likely that the organisms which cause the disease, whichever they be, quickly establish themselves in the body and all efforts to eradicate them must be difficult and unsatisfactory. We have frequently called attention to the remarkable apathy of the medical profession with regard to droplet infection. This report is a case in point: its authors strongly suggest that rheumatic infection enters by the throat, but instead of emphasizing the necessity for preventing its entrance they confine their attention to doubtful palliative measures for dealing with the after-effects of the invasion.

Instead of locking the door before the steed is stolen they suggest means of lessening the evils which result from the theft.

The Use of Oxygen in Anæsthesia.

By LEONARD HILL, M.B., F.R.S.

(British Med. Journ., April 24th, 1926, p. 729).

THE following are some of the important statements contained in this very valuable paper.

Ether is far less liable to cause dangerous symptoms than chloroform and ought to be always used excepting only in cases where very special circumstances indicate the use of the latter. Chloroform is less irritant, excites less feeling of suffocation. Chloroform may have to be used in cases where excitement is to be avoided, in cases of bronchitis, in the case of drunkards and in cases where naked lights are necessary or the actual cautery used and in very hot climates where owing to rapid evaporation of ether and want of a proper closed apparatus for inhalation it is difficult to produce anæsthesia. But in many of such cases the safe anæsthetic nitrous oxide and oxygen, if available, should be chosen, or the new anæsthetics recently introduced. Propylene is also said to be a safe anæsthetic. A mixture of 70 per cent. propylene, 25 per cent. oxygen, and 5 per cent. nitrogen induced analgesia in one minute, anæsthesia in two minutes, and respiratory failure only after sixteen to twenty minutes. Nitrous oxide and oxygen form an ideal anæsthetic, while in the case of chloroform necrosis of the liver follows in a not inconsiderable percentage of cases. Such mixtures as A. C. E. are dangerous on account of the chloroform they contain. The conclusion reached by the American Committee on Anæsthesia was that the use of chloroform as the anæsthetic for major operations is no longer justifiable. As a means of avoiding the ill effects of a prolonged period of ether excitement in alcoholic subjects the temporary employment of chloroform is perhaps sometimes the lesser of two evils. If a change to chloroform has to be made it should be made early. Chloroform should never be administered after a prolonged period of ether excitement. As soon as full anæsthesia is obtained ether should be substituted.

It is only in bad subjects with dilated, fatty, or diseased hearts that syncope may occur under the asphyxial strain of inducing ether anæsthesia. But under chloroform the healthiest subjects may die from heart failure.

Want of oxygen has an injurious effect on living cells. Diabetics suffer especially from want of oxygen. For them such an anæsthetic as nitrous oxide and oxygen should be avoided as much as possible.

Ether and oxygen are highly inflammable. Nitrous oxide and oxygen offer an ideal anæsthetic for dental surgery; the average time of inhalation Hewlett found to be 110½ seconds, the average available time 44 seconds, but varying from 21 to 90 seconds. The addition of a small dose of ethyl chloride is effectual in prolonging the anæsthesia, and appears to be a safe proceeding.

The main cause of deaths under chloroform is cardiac fibrillation, which occurs in the initial stages of anæsthesia, and may be a consequence of too light an anæsthesia and of struggling or sensory excitation. The distinguished medical statistician M. Greenwood has concluded that the condition called status lymphaticus, often made an excuse for fatalities arising from anæsthesia, is a make-believe.

The fatal cases of syncope are due to fibrillation, and these can be recovered, according to MacWilliam, by injecting 0.1 to 1 mg. of adrenaline (using a 1 in 10,000 solution) into the cavity of the left ventricle, or by rhythmic massage of the heart. To effect this massage through the chest wall is very difficult in an adult man. The method then to follow is to make an abdominal incision and through this cut the attachment of the diaphragm to the left costal margin for two inches. The left hand is inserted into the left pleural cavity and the heart grasped through the pericardium and rhythmically squeezed, the wrist preventing air entering the pleural cavity. The rate of compression should be about that of the normal heart. Massage should not be abandoned under an hour, short pauses being allowed at intervals. An occasional intermittent compression of the abdomen to fill the heart helps. Perflation of the

lungs by mouth-to-mouth method, or by a stream of air or oxygen blown in by intubation of the larynx, must be kept up. Artificial respiration can be first tried, but in this desperate condition there must not be more than a very few minutes' delay before direct massage of the heart is begun, because if delay is too long, even though the heart recover, the nervous system is damaged by prolonged oxygen starvation, and the patient dies from this reason.

In every operating theatre there should be available a cylinder containing oxygen and 5 per cent. carbon dioxide. By using this with ether at the beginning of anæsthetization deep breathing is obtained and quicker narcosis. A lower percentage of ether can be used and less irritation of the bronchial mucosa caused. After prolonged ether anæsthesia the colour and fullness of the veins in the skin are restored by breathing this mixture. By using it alone after operation the deep breathing excited by the carbon dioxide washes ether out of the body and introduces oxygen; this greatly lessens the after-effects and helps recovery. It is an advantage to give a liberal dose of morphine half an hour before initiating anæsthesia.

Turning to local anæsthesia, we know that cocaine is a general protoplasmic poison, and its poisoning action is exerted on the central nervous system, the symptoms being excitement, convulsions passing into coma, and death from asphyxia. The artificial alkaloids used as a substitute for cocaine are much less poisonous, and have not the same constricting effect on the blood vessels. Thus novocain is quickly destroyed in the liver, and is for this reason much safer. Adrenaline increases the toxicity of cocaine according to the findings of the committee of the American Medical Association. The committee believes that local anæsthetics may be applied safely in the following concentrations and total amounts: Cocaine in the mouth 5 per cent., in the nose up to 10 per cent., and in total amounts of from 10 to 15 minims containing at most 1 to 1.5 grain. In the eye not over 5 per cent. should be used. In the larynx 10 per cent. and not over 15 minims, containing 1 to 1.5 grains. Novocain in concentrations not greater than 1 per cent. Adrenaline or epinephrin should not be used with cocaine in concentrations greater than 1 in 10,000, and not more than 10 minims of this—with novocain up to 1 mg. of adrenaline is allowed; but even this dose may be unsafe in patients suffering with hyperthyroidism. In poisoning cases the heart must be massaged by artificial respiration to keep up the circulation through the liver; the injection of any other drugs is probably useless, and may increase the danger.

The Mortality in India from Wild Animals.

(The Statesman, 18th July, 1926).

THAT the toll of human life that wild animals and venomous snakes take every year is decreasing is shown by the annual returns for 1925 which have now been received from local Governments and administrations. Tigers are again responsible for the largest number of deaths.

The total number of persons returned as killed by wild animals in British India during the year is 1,974 as against 2,587 in the previous year and 3,605 in 1923. Tigers were responsible for 974 of these deaths, leopards for 191, wolves for 265, bears for 82, elephants for 78 and hyenas for 6.

Madras returned the highest number of deaths caused by tigers, the Central Provinces and Berar the highest number caused by leopards, the United Provinces by wolves, Bihar and Orissa by bears, and Assam by elephants.

Of 388 deaths caused by other animals 73 are assigned to wild pigs and 98 to crocodiles and alligators. The highest number of deaths caused by all wild animals occurred in Madras (464), Bihar and Orissa, the United Provinces and the Central Provinces and Berar coming next in order. The mortality attributable to elephants showed a marked increase in the provinces where the

animals are mostly found. There has been a noticeable decrease in deaths caused by all other animals, except bears, in almost all the provinces.

Deaths from snake-bite fell from 19,867 to 19,308. Decreases occurred in Madras, the United Provinces, the Punjab, Burma, Bihar and Orissa, the Central Provinces and Berar and Assam but Bombay and Bengal have reported slight increases during the year under review. Wild animals numbering 21,605 were reported to have been destroyed, of which 1,609 were tigers, 4,660 leopards, 2,485 bears and 2,361 wolves.

A sum of Rs. 1,55,667 was paid in rewards against Rs. 1,69,765 in the previous year. The number of snakes destroyed in India proper decreased from 47,105 to 41,004, and rewards paid for their destruction were Rs. 1,579 as against Rs. 1,403 in the previous year.

Reviews.

FACTS ON THE HEART.—By R. C. Cabot, M.D., Professor of Medicine, Harvard University. London and Philadelphia: W. B. Saunders Co., Ltd., 1926. Pp. 781. Illustrated. Price, 35s. net.

THE aim and object of the author has been to collect and correlate all the facts of 1906 "heart cases" dealing with 4,143 lesions.

The material was obtained from the records of the Massachusetts General Hospital. He has succeeded admirably for only facts are dealt with and this means that in all these cases post-mortem examinations were made and the anatomical findings form the basis of the arguments presented.

The symptoms and physical signs found during life are all considered in relation to the anatomical diagnosis, and several most interesting results have been obtained. It was found that 77 per cent. of all heart diseases was due to simple hypertrophy and dilatation, without valve lesions, but associated with hypertension.

Pure mitral regurgitation, that most frequently diagnosed condition, was extremely rare, for it was practically never found post-mortem. In all these cases there were but seven in which the mitral valves might have been incompetent only, and three of these were very doubtful.

A mitral systolic murmur, even if loud and conducted to the axilla, does not mean mitral regurgitation. It is found much more frequently in other conditions such as anæmia, dilatation of the heart, and even in hearts which are apparently normal.

Mitral stenosis was much more common and was sometimes associated with incompetence. All the facts that such a method of investigation has revealed concerning the other diseases of the heart are also collected and presented in a delightful manner, and the results are wonderfully interesting.

This book cannot fail to be of great interest and value to all who are interested in heart disease. It is admirably printed and illustrated. The dialogues between the physicians and pathologist at the post-mortem table form an unusual feature and indicate many of the difficulties encountered by both.

It seems strange to find a book on the heart in which there are no polygraph tracings or electrocardiograms. They are not needed however and would indeed possibly detract from the merits of this work.

H. H.

SURGERY: A HUNDRED YEARS AGO. EXTRACTS FROM THE DIARY OF DR. C. B. TILANUS.—Edited by Professor H. T. Deelam. Translated from the Dutch by Joseph Bles. Geoffrey Bles: London. Pp. 156. Price, 6s.

IN November 1818 three young Dutch surgeons, who had recently taken their degrees at the University of Utrecht, set out on a tour through Belgium, France and Western Germany, visiting various famous clinics.

That they must have been young men of parts may be inferred both from the fascinating diary kept by one of them, of which extracts from the medical portions are here presented, and from the fact that all three in later years became professors in the universities of their motherland.

After a brief visit to Louvain, they made their way to Paris where they stayed six months, visiting the clinics, museums, crèches, foundling hospitals, etc., but spending most of their time sitting at the feet of the illustrious surgeons Dupuytren and Larrey. The diarist gives us a vivid pen picture of Dupuytren, a man of boundless ambition and energy, proud, frigid and suspicious, jealous of his colleagues and not above employing underhand means to damage their reputations. He was ever the first to arrive at the Hotel Dieu and the last to leave, doing everything himself and leaving nothing to chance, a clear didactic teacher, a bold surgeon "aucun n'eut l'âme plus imperturbable dans le danger," no wonder he was the idol of the students. We read that the operations performed in the clinic fell mostly into three classes,—the removal of stone from the kidney (surely this is a misprint for bladder), the treatment of hernia, and fractures with their subsequent amputations. The accounts of cases here cited make depressing reading, with their inevitable sepsis and terrific mortality. Yet in spite of this the surgeons of those days tackled cases which we should approach much more cautiously nowadays, thus we read of the removal of a great stone of 12 ounces from the bladder by the suprapubic route, with perineal drainage. Death followed from peritonitis and the post-mortem disclosed multiple calculi in the left kidney and an impacted calculus in the right ureter. The diarist remarks that the condition of the kidneys, though not the cause of death, would have ended the patient's life in a short time. With modern methods these complications could have been recognised before operation and the case would have been dealt with by a series of operations, when the renal functions had been re-established.

Compound fractures were almost without exception infected, the terrifying vision of tetanus stood all too frequently beside that of infection, and the death rate was colossal. The unfortunate patients were subjected to repeated venesections, leeches were applied twenty or so at a time, "arranged in military order" and purgatives and clysmata drained away the patient's remaining strength, as well as his toxins.

Hernie were generally strangulated when admitted and usually led to a permanent faecal fistula, if the patient escaped with his life, as the gut was never replaced in the abdominal cavity when its condition was doubtful.

Every hard lump in the mammary gland was looked on as a cancer, whatever the age of the patient, and in the real cancer cases the axillary glands were never removed. Attempts were made to amputate the carcinomatous cervix uteri, but caustic pastes were the usual treatment and on another page we read of a dreadful torture called the "moxa," which consisted of the application of a piece of burning charcoal to the part of the body in which it was desired to set up counter-irritation, a result which was doubtless usually achieved. The diarist is however sceptical about this procedure, by which it was claimed to cure hæmoptysis in phthisis; he remarks that no mention is made of the failures.

The Société de Médecine held clinical meetings at which cases were shown and rival professors aired their views, but the rapid delivery of the lecturers and the continuous chatting in which the members indulged made it difficult for the visitors to take in all that was said, difficulties which have not even yet been surmounted in some modern medical societies.

We deeply regret that we are not permitted to read those sections of the diary which detail the doings of these young men in their idle hours, for surely such keen observers would have left a delightful account of the life of the Quartier Latin in those days. Perhaps they were too serious to waste time over such trivialities, for we find here a contemptuous reference to a soirée at the

house of the Dutch Consul—"500 or 600 guests continually entering and leaving,..... brilliant dresses of the Parisian ladies—beautiful women—some made-up old hags—whist in one room—some gambling game in the drawing-room—refreshment handed round—at 2 o'clock we left disgusted at the thought of having to spend every evening in such a manner." After this they went to view a panorama of Amsterdam and recorded this hour as one of the most enjoyable spent in Paris!

Our travellers spent the summer months of 1819 on a walking tour from Strasburg to Tübingen, Stuttgart and Heidelberg, Frankfurt, Giessen, Marburg, Cassel and Halle, whence they returned to Holland. Most of the notes on this part of the tour deal with the collections of natural history, anatomical and pathological specimens which they inspected; of the actual work in the clinics we get few details. One gathers that the German university professors taught on rather academical lines and had few beds at their disposal. They were everywhere kindly received and the professors appear to have exerted themselves to show off their museums and clinics to the visitors, not always gratuitously, however, for we read of one professor into whose hand they slipped two thalers "which His Excellency did not refuse"; they add rather apologetically that he had a small stipend and had to depend somewhat on these gifts. In Heidelberg they met Nägele and Tiedermann, and at Giessen they attended a Degree Day, at which they were shocked to see the professors not wearing their gowns and some of them not even in black. At Halle they visited Professor Meckl's museum, which contained the remains of the professor's grandfather, who founded the collection and gave orders that his own skeleton should be included and labelled No. 1, a fact which they did not learn till afterwards.

Altogether a very fascinating book, illustrated by some good reproductions of portraits of these old professors; and lest its perusal should inspire us with a too complacent satisfaction at the present position of surgery, let us recall that in 1840 the author, then Professor of Surgery in Amsterdam, stated in an inaugural address that "though surgery was not yet quite perfect, it was within measurable distance of being so." Who knows what will be thought of our present methods 85 years hence?

W. L. H.

AN INTRODUCTION TO SURGERY.—By Rutherford Morison, M.D., F.R.C.S. (Eng.), and Charles F. M. Saint, C.B.E., M.D., F.R.C.S. (Eng.). Second Edition. Bristol: John Wright & Sons, Ltd., 1925. Pp. 347. Price, 15s. net.

ALL who have to teach junior students must have felt the want of some book which would make the principles of surgery clear to their minds. Each case presents an individual problem, to elucidate which masses of detail must be considered and discussed. A student will often answer satisfactorily a series of questions on the clinical signs of a case and yet a question directed to the basic principles on which these signs rest will show that he has failed to grasp these principles and is unable to see the wood for the trees. In consequence it is fairly certain that the lessons of the case will be quickly forgotten. It is to help the student to arrange his surgical ideas in clear logical sequence and to think out the problems presented to him in the wards, that this book was written. Shock, hæmorrhage, inflammation, granulomata, malignant disease, interference with the circulation, etc., are all set out here in almost tabular form, with their causes, pathology modes of termination and lines of treatment, so that the general principles laid down may be applied to any region or organ of the body. The special pathological conditions affecting the hollow muscular systems and the serous cavities are similarly dealt with.

In this edition Professor Saint contributes an appendix in which he presents a general scheme of the basis of the principles of surgery and then proceeds to apply the same to a number of type conditions such as fractures, appendicitis, stricture of the urethra,

carcinoma of the breast, etc., in a very clear and instructive manner. Unfortunately basic principles require a fair amount of knowledge of the subject for their proper comprehension and when set out unadorned are apt to make tough reading. We fear that the average student will find this book too difficult for him, until it is elucidated by his teacher. For the latter it will be found an excellent skeleton on which to build up a course of lectures on surgery as it ought to be taught. To all teachers therefore we can recommend the book most heartily; the only suggestion we can make for its improvement in the next edition is that the modern methods of treating syphilis be described in more detail and that the old mercurial treatments be totally eliminated, as they have been from all modern clinics.

W. L. H.

PEDIATRICS.—By various authors. Edited by Isaac A. Abt, M.D. Vol. VII. In Eight Volumes. London and Philadelphia: W. B. Saunders, Company. Price, £18 per set.

THIS is the seventh volume of this important system of diseases of children. As in the case of the previous volumes each chapter is contributed by a different writer and each writer is a specialist in his particular subject. All the contributors are American physicians or surgeons attached to one or other of the large hospitals in that country.

This volume is devoted entirely to diseases of the nervous system and commences with a chapter on the physiology of the nervous system in early life written by Dr. Percy B. Stiles, the assistant professor of physiology at Harvard University.

The surgery of the head and spine has been dealt with very thoroughly and at some length by Dr. Ernest Sachs. He describes the operative procedures for such congenital conditions as hydrocephalus and meningocele, for tumours, injuries, and a number of infections such as cerebro-spinal meningitis; many of the conditions are illustrated and there are also a number of illustrations which demonstrate technique. There is a useful chapter on convulsions in infancy and childhood, which is followed by one on infantile neuroses. There is a most excellent chapter on the anatomy and physiology of the spinal cord in which are included some very useful coloured plates, diagrammatic representations of cross sections of the cord at various levels and the cutaneous sensory distribution of the various segments of the spinal cord. Finally, there are chapters on psychopathology, defects of speech and the sexual life of the child.

This volume is quite up to the standard of its predecessors. There are a number of very excellent illustrations. There is a useful bibliography at the end of each chapter and the volume is well indexed. The "get-up" is of the excellent quality which we have been led to expect from these publishers.

PRACTICAL HISTOLOGY FOR MEDICAL STUDENTS.

—By D. T. Harris, M.B., B.S., B.Sc. Second Edition. London: H. K. Lewis & Co., 1926. Pp. 35, with 2 plates, including 1 coloured. Price, 7s. 6d. net.

THIS is an admirably arranged book for students in practical histology, which can be recommended as a model of what such a work should be.

It is well produced, is illustrated, and has ample spaces for drawings.

G. S.

A MANUAL OF THE PARASITIC PROTOZOA OF MAN.—By C. F. Craig, M.D., M.A., Lt.-Col., Medical Corps, U. S. Army. London: J. B. Lippincott, Co., 1926. Pp. 569, with 95 illustrations. Price, 35s. Obtainable in India from Messrs. Butterworth & Co., India, P. O. Box 251, 6, Hastings Street, Calcutta. Price, Rs. 26-4-0 net.

Prior to the Great War the science of medical protozoology was one which was in rather a confused and undeveloped state. The pioneer work of such workers as Dobell, Wenyon and O'Connor, W. M. James, and

others, however, did much during the war years and subsequently to produce order where previously there had been chaos. And the author of this excellent monograph is also a worker who has made many interesting contributions to the science. The close of the war and the period 1919-1922 saw the publication of several excellent monographs dealing with different aspects of medical protozoology but nowhere was there any real text-book on the subject. It was soon recognised that a text-book was not merely badly, but most urgently needed. Medical protozoology covers an enormous range of diseases encountered in the tropics; amœbic dysentery, malaria, the leishmania infections, sleeping sickness, espundia, S. American trypanosomiasis, to name but a few. Hence it became imperative that suitable text-books for students should be produced.

The first attempt to really supply this want—as far as the reviewer knows—was the excellent text-book by Hegner and Taliaferro (1924). It was an admirable book but—as is inevitable in such a work—whilst those sections dealing with subjects to which the authors had paid special attention were excellent, other sections were not so good.

The present volume is an admirable attempt to provide the medical student, laboratory worker, public health worker, and protozoologist with such a text-book. Knowing to what an extent the author has been involved in different protozoological controversies, it is pleasant to state how very unbiassed and free from prejudice the present work is. The author, of course, does not omit to record *Cragia hominis*, a flagellate entamoeba which he himself first described, but which is not generally admitted as a parasite of man. He differentiates *Plasmodium falciparum quotidianum* as a separate species of malarial parasite, which causes daily fever with daily rigors—a position which many workers with experience will not be prepared to accept. He also accepts *Plasmodium tenue* as a new and valid species, chiefly on the strength of Sinton's observations on this parasite; also *Plasmodium ovale* as a valid separate species, identical with *Plasmodium vivax minutum*, described first by Craig in 1900. Further, it comes as a shock to the reviewer to see that a transient infection of the saliva of a patient with a free-living *Bodo*, described by the reviewer and his co-worker, is now elevated into a new species, *Bodo salivarius* Knowles and Das Gupta, 1922; no such claim was ever made by the original workers.

Such, however, are minor points; and the inclusion of doubtfully valid new species and genera has at least this value, that it may serve to draw attention to a few of the unsolved problems and difficulties in medical protozoology.

The publishers are to be most warmly congratulated on the general get-up of the book. The paper is excellent, the binding good, and the reproduction of the microphotographs with which the volume abounds is splendid. The microphotographs indeed deserve a special word of praise; most of them are from the U. S. Army Medical School collection, and they are simply splendid; nowhere else have we seen such clear and well executed microphotographs. Whether a student will not learn more from a well executed black and white line diagram of a life cycle than from a microphotograph is a moot point, and we consider that the author might have included far more simple black and white line diagrams—especially of life cycles—for the benefit of the student; but, on the other hand, no laboratory worker who takes up the book will fail to be impressed by its admirable microphotographs. They are the best that we have seen.

The book, in brief, is admirably suited to the needs of students and laboratory and public health workers. Life cycles, modes of reproduction, transmission, and modes of infection of different protozoal infections are clearly and lucidly set forth; and the bibliography, although not exhaustive, is very complete. The appendix deals with special cultural, staining and fixative methods, and will be of great value to the laboratory worker.

There are no colour plates in the volume, but its microphotographs are probably better than any colour plate. In a few places the terminology is a little inexact; thus "gametes" is used where "gametocytes" is meant in a few places. "Sporulation" of the malarial parasite is also a term which should not be used; as it may mean either asexual schizogony or the production of sporozoites as a product of the sexual cycle.

The price of the volume is unfortunately a little high for Indian students; but, considering the excellent way in which it has been produced by the publishers, it is not in reality high. This book will meet a long-felt want; the author writes in his preface:—"This manual is not a zoological treatise, but is intended for the use of health officers, medical practitioners, teachers, laboratory and research workers, and medical students. It does, however, contain what is believed to be an adequate discussion of the history, nomenclature, and generic and specific position of each of the organisms described, from the view-point of the medical practitioner and student." In this aim the author has succeeded admirably; the book will be a most valuable *vade mecum* to laboratory workers, post-graduate students, and to lecturers in the subject. We must congratulate the author on one of the most valuable contributions to the science of medical protozoology yet published. We trust that a second edition will soon be called for, and that it will give the author the opportunity of including more black and white line drawings for students. But we have no hesitation in recommending the volume as it stands to the attention of the numerous laboratory workers and protozoological students in India.

R. K.

BERGEY'S MANUAL OF DETERMINATIVE BACTERIOLOGY.—By D. H. Bergey. Second Edition. Baltimore: The Williams & Wilkins, Co., 1925. English agents: Messrs. Baillière, Tindall & Cox, London. Pp. xvi plus 462. Price, 25s. net.

This manual of determinative bacteriology is the official publication of the Society of American Bacteriologists. As there is at present no similar society in Great Britain, English-speaking bacteriologists have no alternative and must accept as final the rulings of this Society on the subject of nomenclature. In the first edition of this book the committee of the Society invited criticism. They did not consider that the classification which they suggested was in any way final but constituted a "progress report leading to a more satisfactory classification in the future." This very fair statement might conceivably have caused in the pessimistic reader a certain amount of panic as the prospect of facing a new classification every few years was an alarming one. This second edition should certainly allay these fears. The changes that have been made are very few. From the point of view of the medical bacteriologist the most important changes are the re-arrangement of the family Coccaceae in which the genus *Staphylococcus* has been removed from the tribe Streptococcaceae and placed in the tribe Micrococcaceae, the substitution of the generic name *Klebsiella* for *Encapsulatus*, so that the organism which many of us first knew under the name of Friedländer's bacillus and later as *Encapsulatus pneumoniae* has now come to rest—we hope—under the name *Klebsiella pneumoniae*, and the substitution of the generic name *Borrelia* for *Spirillum*.

In addition to these few alterations, certain additions have been made in the text of the book in order to make the identification of unknown organisms simpler. The committee repeat their invitation for criticism and for additional information with regard to which will be likely to lead to an edition of subsequent editions of this manual.

There is an introduction which gives briefly the history of the classification of bacteria from Müller, who in 1786 recognised two genera, to the present classification. Following this there is a short chapter on the rules of botanical nomenclature which have

been adopted by the committee of the Society in the absence of any bacteriological code. The rest of the volume is occupied by the main subject-matter, the key for the identification of organisms of the class Schizomycetes.

No bacteriological laboratory is completely equipped without a copy of this manual.

AN ATLAS OF MIDWIFERY.—By Comyns Berkeley, M.A., M.C., M.D. (Cantab.), F.R.C.P. (Lond.), M.R.C.S. (Eng.), and Georges M. Dupuy, M.D. London: Baillière, Tindall and Cox, 1926. Pp. 160, with 248 figs. and X-ray supplement. Price, 7s. 6d. net.

We heartily welcome this little book which has been written by that well known obstetrician, Dr. Comyns Berkeley in partnership with Dr. G. Dupuy. The book is, as stated, an atlas of midwifery, and consists of 266 diagrams which are divided into five sections, namely—anatomy, pregnancy, labour, the child, and radiology.

The written matter of the atlas is extremely brief and except for a short description of the placental and foetal circulation, and a note on the auscultation of the pregnant uterus, the descriptions of the diagrams are limited to a mere half dozen lines or so. Indeed, in some cases nothing but the names of the structures drawn in the diagrams are written.

The authors are however to be congratulated on the skill and clearness with which the diagrams have been drawn, especially those dealing with the diameters of the foetal skull, which engages in the maternal pelvis during labour, which are so well and distinctly drawn that any student studying them for the first time can easily understand the relationship of the various parts.

The atlas is of course not intended to make the study of obstetrics "easy" by taking the place of a text-book, but is intended to help the student to understand fully the subject-matter of his text-book, for which purpose it is admirably suited.

The final section contains eight skiagrams showing the position of the foetus *in utero*.

THE HYGIENE OF SEX.—By Max von Gruber, M.D. London: Baillière, Tindall & Cox, 1926. Pp. xli plus 169, with 4 plates. Price, 7s. net.

In this book the author has endeavoured to instruct the normally minded individual in the most advantageous way of living the sexual life from the health point of view.

This is an extremely delicate subject, and one which is very difficult to explain clearly to the general public without being too technical or too blatant. Dr. Gruber has succeeded in overcoming both these difficulties, and has placed a very useful treatise within the reach of those who seek information on, or who are interested in the subject. The first chapter deals with fertilisation, and contains two plates to explain simple cell division, with the division of the fertilised ovum. After the theory of heredity and breeding has been discussed, the author describes the organs of sex, explains what is meant by the sexual instinct, and teaches the value of limited sexual intercourse, and the limitation of the family. The latter part of the book deals with the training of the young and ignorant mind in matters sexual, and describes the grave dangers of consorting with prostitutes and mistresses, and of the effects of venereal disease, and further exhorts the individual to refrain from gratifying the sexual desire until lawfully married.

We do not agree with the author that young children should not be told the story of the "stork," but that as soon as they manifest curiosity in their advent they should be instructed in the methods of reproduction.

As we have already stated the book has been written with the idea of instructing those who are about to marry, and start their sexual life, and if the book is read intelligently by them, they will derive much benefit and helpful advice from it. At the same time it is not a book which every young boy and girl should be given

to read, but should only be recommended to those who genuinely require advice and who will not read the book merely to acquire sexual knowledge.

THE DOCTOR'S BOOKS.—By A. P. Bortwistle, M.B., B.Ch., F.R.C.S. (Edin.). London: John Bale, Sons & Danielsson, 1926. Pp. 32. Price, 1s. 6d.

THIS little brochure will be of interest to all medical practitioners with a large private practice. The author details what books should be kept by a doctor, and how to keep them. He points out how slipshod and unsatisfactory medical book-keeping often is; so that a locum can often hardly understand what has happened previously in the practice, or, when a practice comes to be sold, it is difficult to assess its real value.

The books advocated are five in number. (a) The Day Book gives an account of all money received and owing and is the basis of the financial side of the practice. Entries of amounts due are kept in the left hand pages; of amounts paid in the right hand page; the totals are added weekly and analysed in the ledger and cash book. (b) The Case Book is a loose leaf book with a narrow column for diagnosis, either proved or tentative, a broad column for treatment, and a narrow column on the right for results; also with an alphabetical index. By means of this book the history of a patient can often be traced for several past years, and information given in case of consultation, etc. (c) As a Visiting Book the author recommends Messrs. Burroughs, Wellcome & Co.'s Medical Diary. (d) The Cash Book is kept by simple entry, entries on the left being receipts, on the right being expenditure. This is made up from the Day Book and cross references are entered. (e) The Ledger is kept by double entry, the left hand pages being for money due and the right hand pages for money paid into the practice. A page is allotted for each habitual patient. Advice on income-tax returns, and a specimen filled-in page or double page of each book complete the little volume.

It is one which may well be recommended to medical men with an extensive private practice; as it would appear to simplify and standardise book-keeping. It is also a suitable system for dentists.

CONTRIBUTIONS TO OPHTHALMIC SCIENCE. JACKSON BIRTHDAY VOLUME. Wisconsin: George Banta Publishing Co.

THIS volume is dedicated to Dr. Edward Jackson by his colleagues and pupils in the United States in honour of his seventieth birthday and in recognition of his distinguished career which still remains unabated.

To ophthalmologists the name of Jackson is world famous and during the last forty-five years he has written prolifically and has touched upon most of the subjects which ophthalmology presents for study and elucidation. Certain of his papers deserve special mention for the influence they have had in promoting advance in the refinement of ophthalmic examination. His paper published in 1885 on determining the refraction of the eye by the use of the plane mirror was received with universal appreciation of its value and accuracy, and time has proved that skiascopy is by far the most accurate objective test of the refraction of the eye.

His work on the dioptries of the eye and the complex problems of the heterophorias and heterotropias is well known. His technique in quantitative perimetry is widely adopted and as a result perimetric results are much more valuable. His investigations on tuberculosis of the retina deserve the highest recognition.

His literary works are exceedingly numerous. His bibliography contains more than six hundred titles. The *American Journal of Ophthalmology* of which he is editor-in-chief owes much to his genius and ability.

The present volume contains 40 scientific contributions all by ophthalmologists living in the United States, two of whom have died while the volume was in course of preparation.

In addition there is a bibliography of the contributions of Dr. Jackson to ophthalmology, general

medicine, etc. An excellent engraving of the portrait of Dr. Jackson forms an appropriate frontispiece.

The book is unique in that it contains articles by the leading ophthalmologists in the United States. Many of these writers are well known in this country. It is well illustrated and excellently got up and we cordially recommend it to all interested in this branch of medicine.

The articles are varied and mostly concerning subjects which arise in the daily routine of the ophthalmic surgeon and as a whole will be found instructive, stimulating and interesting. The volume is a huge success and is a fitting tribute of appreciation to one who is so well known and respected in this country as well as in the United States of America. He has given much to the literature of ophthalmology and as a master of that science his name will go down to posterity as one of the greatest ophthalmologists of his age.

E. O'G. K.

A PSYCHOLOGICAL STUDY OF IMMIGRANT CHILDREN AT ELLIS ISLAND.—By Bertha M. Boody, Ph.D. The Williams and Wilkins Company, Baltimore, U. S. A., 1926. English Agents: Messrs. Baillière, Tindall & Cox, London. Pp. 163. Price, 18s. net.

THIS book makes one realise how deeply interested the authorities of the U. S. A. are in the whole question of immigration. The legislation which has been enacted has all tended towards elimination of useless material, a striking case in point being the passage of the Illiteracy Test by Congress which has reduced illiteracy from over 20 per cent. to about 3 per cent. of the total immigrants. The machinery at Ellis Island is vast and comprehensive and one can quite understand the origin of the purely journalistic articles of the horrors of Ellis Island which no power could possibly prevent when thousands of immigrants are being passed through. Interesting undoubtedly this book is, but of necessity it is one with a limited appeal to any but those who are interested in psychology.

EPILEPSY—A FUNCTIONAL MENTAL ILLNESS, ITS TREATMENT.—By R. G. Rows, M.D. (Lond.), Pathologist and Medical Officer, County Mental Hospital, Prestwich, Manchester, and W. E. Bond, M.R.C.S. (Eng.), L.R.C.P. (Lond.), a Senior Medical Officer to the Ministry of Pensions. London: H. K. Lewis & Co., 1926. Pp. viii plus 138. Price, 8s. net.

THE emotional origin of epilepsy is the main theme of this most interesting book. Realising the indefinite and misleading pathology of the condition the authors have utilised to the full the vast amount of post-war material at their disposal and by very careful case taking, have arrived at the conclusion that epilepsy is a functional nerve disease with its root cause in the emotions.

Working on this hypothesis they have instituted a line of treatment of explanation, exploration and re-education, the rationale of which is that the patient has to work out his own salvation by self re-education based on understanding the cause of his disease. They aver that drugs have no legitimate place in the treatment of this disease except as a temporary measure. They claim to have had complete recoveries and this in itself is enough to recommend a close perusal of this book by the general medical practitioner.

Annual Reports.

ANNUAL REPORT OF THE INFANT WELFARE CENTRE, KUALA LUMPUR, F.M.S., FOR THE YEAR 1924. BY DR. M. JOSEPHINE WARE.

THIS centre was first started in July 1922 in two rooms of a Chinese house, but in December 1924

rebuilding operations were completed and the centre is now completely housed. This means more comfortable accommodation for mothers and babies, writes Dr. Ware; also it provides space for the umbrella, the basket of cocks and hens, and the husband—accessories which usually accompany the patient, and which the mother apparently places in that order of importance.

The staff consists of one lady medical officer, two European nursing sisters, and four health visitors. Posters in Malay, Chinese and Tamil are made much use of, and individual tuition to mothers is a special feature of the centre. The regular weighing of infants was at first objected to by the mothers, but they have now become accustomed to it. The infant's daily bath was a more serious difficulty, since the Chinese or Malayan mother prefers to wash her infant piecemeal and in any case will refuse to remove the charm from its neck; one such "charm" which was examined, and to which valuable curative properties were attributed, bore the inscription "1915. Selangor. One dog. 1669."

The antenatal work includes medical examination of the patient, clincial examination of the urine, etc., and often the Wassermann test,—the last carried out at the Kuala Lumpur Institute for Medical Research; 142 such patients were examined during the year. Attendances of women, infants and children at the centre during the year totalled 16,238. The chief difficulties to be faced by the health visitors are puerperal sepsis and post-puerperal beriberi, which latter appears to be not unimportant in the Federated Malay States. The addresses given are often difficult to find among Chinese patients, whilst the health visitor not infrequently arrives after an exhaustive search, only to find that the baby has been taken away by the mother-in-law. On the other hand, health visiting has proved to be invaluable in bringing mothers and babies from remote *kampungs* and districts to the centre. A total of 10,532 visits was paid by the health visitors during the year.

In addition to work at the centre, propaganda work was steadily carried on during the year. An infant welfare exhibit and a baby competition were held in July. A similar exhibition was also held at Ipoh. The baby competition was the first ever held in the F.M.S.; and at first mothers were rather chary of entering their infants for it, and rather suspicious of its purport; in the end, however, the entries numbered 240, and it was very popular.

The centre is clearly in very active working, and is bringing much needed skilled assistance and education to Malay, Chinese and Tamil homes.

REPORT ON THE AGE DISTRIBUTION AND RATES OF MORTALITY DEDUCED FROM THE INDIAN CENSUS RETURNS OF 1921 AND PREVIOUS ENUMERATIONS. BY H. G. W. MEIKLE, F.F.A., ACTUARY TO THE GOVERNMENT OF INDIA. CALCUTTA: GOVT. OF INDIA CENTRAL PUBLICATION BRANCH, 1926. PRICE RS. 2-12-0.

THIS report will be of interest to Directors of Public Health and other public health workers; also to medical officers of insurance companies. Yet it is a report which it is almost impossible to review; one is left with the impression that, despite his monumental industry, the author—in common with every worker who has to deal with Indian vital statistics—cannot see his way through the fog of uncertainty and misstatement which enshrouds the problem. For instance, there appear to be very few Indian children aged 1 to 4 years of age; they are all either infants under one year of age or children of five. The attempt to separate the figures for Sikhs in the Punjab from those for Hindus breaks down because in one census only those who wore *kash* and eschewed tobacco were entered as Sikhs, whereas in another all those who stated that they were Sikhs were entered as such; further, there has almost certainly been a considerable conversion of low caste Hindus to Sikhism. Similarly, the proselytising influence of Mohamedanism

has caused marked changes in the figures for some provinces, especially Bengal.

The census is carried out by about two million enumerators, nearly all of them ordered to do the work by Government, apparently without extra remuneration. The uneducated Indian has only the vaguest idea of his own age, he may know the approximate ages of his sons—especially if they are in Government service; but of the ages of his wife, his mother-in-law, his paternal aunts, his uncle and his grandmother—who may all be living in his household—he has no notion at all; the figures may be a decade or two in error. Mr. Edye, of the United Provinces Census records that, as a rough test, he had his own age guessed by hundreds of supervisors and enumerators engaged in the census operations; the guesses varied from 16 to 60 years of age.

To attempt to extract information of value from such a mass of statistics, the author investigates the value of the introduction of different correction coefficients. He concludes chiefly that what is wanted is the introduction of more standardised and improved forms of returns in Indian census operations; the information gained can be made much more accurate if certain changes are introduced into the forms employed. In Bengal he traces a most striking difference in the mortality among Mahomedan and Hindu females respectively; and attributes the excess among Mahomedan women to the *purdah*. This is very probably true; it has been noted in connection with phthisis by the Health Officer of Calcutta in his reports. Yet Hindu women are almost as much subject to the *purdah* as are Mahomedan women, and we doubt whether the *purdah* system alone accounts for the whole difference. The example is one which is typical of the mass of difficulties studied in the report. It should be read in the original by those interested.

ANNUAL REPORT OF THE INSTITUTE FOR MEDICAL RESEARCH, FEDERATED MALAY STATES, KUALA LUMPUR, FOR THE YEAR 1924. BY DR. A. T. STANTON, DIRECTOR.

We regret the delay in reviewing this report, but much of the subject matter dealt with has been commented on in our columns from time to time. That Malaya is not behind the times is evidenced by the splendid monographs and publications issued by this institute and the important contributions made by its staff to tropical medicine.

The chief event of the year was the opening of a Pasteur Institute section. Fixed virus strains were obtained from both Kasauli and Colombo and proved to be fully virulent. Semple's carbolised vaccine is used, and put up in different strengths for man and for immunising dogs. In the preparation of the emulsion it is to be noted that forcing the brain matter through very fine wire mesh with a press gives as good an emulsion as the old fashioned method of grinding by hand in a pestle and mortar, and is less liable to the risk of sepsis.

"Tropical typhus" is a problem which has been specially studied by Dr. Fletcher and Dr. Lesslar, and their review of this problem in Malaya was summarised in our issue for July 1926, p. 352. Meliodiosis—due to *Bacillus whitmori*—has also been specially studied and the results incorporated in a series of papers to the *Lancet* and the *Journal of Hygiene*. Dr. A. Neave Kingsbury has also published a report in the *Lancet* on the question of the keeping properties of insulin under tropical conditions, whilst the incidence of diphtheria and of enteric fevers is being studied. Dr. Fletcher has continued his studies on behalf of the Cinchona Derivatives Committee of the Medical Research Council of Great Britain and a special report on cinchona febrifuge was shortly to have been published. (This report, we presume, is the one incorporated in the general report by the Committee, commented on in our editorial for February, 1926, p. 79).

During the year, 193 specimens of tissues were examined for diagnosis or in connection with different in-

vestigations. Blastomycosis infection was encountered for the first time in Malaya,—a cutaneous infection of the abdominal wall, in a Chinaman. Malignant tumours numbered 42 and included two cases of carcinoma of the male breast. No less than 4,973 Wassermann reaction tests were carried out, and a comparative study made of results with Kahn's test and the Wassermann test show an 80 to 94 per cent. agreement in the different groups reported on. An outbreak of cholera at Port Swettenham was proved to be due to Koch's vibrio, but in an outbreak on a tea estate in Selangor the organism incriminated corresponded to the *B. pseudo-cholerae* of van Loghem. With regard to dysenteries, infection with the bacillus of Flexner is the chief cause of dysentery in Malaya, and the bacillary cases far outnumber those due to *E. histolytica*.

The work of the malarial bureau during the year is reported on by Dr. K. B. Williamson. Special surveys were carried out on some estates and at Pulan Jerejak in connection with a site selected for a leper hospital. Experiments with "Paris green" showed that, whilst it is an excellent larvicide, it does not affect the pupæ of either anopheline or culicine mosquitoes. The filtrate from a suspension of "Paris green," however, was found to be decidedly toxic to larvæ; an observation which may have practical bearings. The collection of type species has been added to, and a demonstration of living and mounted specimens was prepared for the Agri-Horticultural Show held at Kuala Lumpur in July. A preliminary enquiry has been commenced into the pH reaction of mosquito breeding waters to test MacGregor's thesis that the degree of alkalinity or acidity may be a main factor in determining the species of larvæ found in them. In general it was noted that the species which tend to breed in cleared jungle, such as *A. maculatus*, *A. karwari* and *A. tessellatus* have a preference for acid water, being found at a pH of from 5.5 to 6.6. Those which breed in marshes, rice fields and ponds, such as *A. barbirostris*, *A. kochi*, *A. sinensis* and *A. fuliginosus* are found at a pH range of from 6.4 to 8.0, but most usually in water which is just on the acid side of neutrality. Larvæ of *A. aconitus* were found in both acid and alkaline waters; whilst *A. ludlowi* will breed in water with a pH of 8, and in water which is definitely brackish. "The observations made so far only prove that this line of enquiry is worth pursuing, and calls for co-operative effort in different districts. But the broad inference is perhaps justified that, though the larvæ of Malayan anophelines are not fastidious as to a few points of pH within their ranges, there are limits awaiting detailed determination, which particular species do not usually pass in Nature." A start has also been made of a study of the algal and botanical flora of the breeding places of different species. (It is obvious that such biochemical studies may be of very great importance in anti-malarial campaigns, and the work at Kuala Lumpur follows on the lines now being investigated in several different quarters). The insect fauna of mosquito breeding sites may also be of importance; thus it was found that *Cercotmetus*—a water bug—floats with its body extended just below the water surface and appears to be specialised in structure and habits for feeding on mosquito larvæ, and especially on anopheline larvæ. Individuals have been reared on a diet consisting only of anopheline larvæ, of which they will consume as many as twenty a day. The local species of fish which prey upon mosquito larvæ are also under investigation.

In reporting upon the work of the bureau, Dr. Williamson—who writes in the absence on leave of Dr. Hacker, the permanent medical research officer of the bureau—comments on the tremendous scope for malarial research work in the Federated Malay States, the necessity for an adequate bureau and personnel, as well as field laboratories. As in India, the present provision is quite inadequate.

The report on the chemical laboratory is by Mr. R. W. Blair, chemist to the Institute. This department has been largely concerned with routine examinations for official departments and with helping the other research

departments of the Institute. Examination of milk and water supplies, of sewage effluents, toddy, and medico-legal specimens, and of miscellaneous articles are the chief activities of the laboratory. It is officially laid down that toddy must not contain more than 10 per cent. of alcohol by volume, or have an acidity exceeding 0.8 per cent. expressed in terms of acetic acid. An important activity of this laboratory is the preparation of a vitamin B extract from rice polishings for the treatment of beriberi. During the year 7,251 fluid ounces of this extract were prepared and 6,630 fluid ounces issued to practitioners and hospitals. In the medico-legal department 877 out of 1,046 coins submitted for examination by the police proved to be counterfeit. Eighty blood stains were received, of which 35 gave positive results, and 25 of them proved to be of human origin. Forty-eight toxicological specimens were received, chiefly in connection with poisoning cases. Finally, the members of the staff of the laboratory were called upon to give medico-legal evidence in 34 cases; (in which matter they have our sympathy, if the courts in Malaya are as dilatory as those in India).

Dr. Stanton, Director of Government Laboratories, F. M. S., is to be congratulated on a report which shows activity in so many different fields of medical research. The report is a very bare outline of the real work of the Institute: however we suppose that as an official document this is inevitable. What we would like to see issued annually from this well-known institute is a collected report and review of all the papers issued during the year, on the lines of the new series of annual reports of the London School of Tropical Medicine and Hygiene. The present report, as it stands, hardly does justice to the distinguished band of research workers who constitute the staff of the Institute. The *Bulletins* of the Institute to some extent give publicity to its work; but one would like to see them, together with reprints of papers published elsewhere, collected into an annual volume, issued for review.

REPORT ON THE JAIL ADMINISTRATION OF THE PROVINCE OF ASSAM FOR THE YEAR 1925. BY COLONEL C. H. BENSLEY, C.I.E., K.H.P., I.M.S., INSPECTOR-GENERAL OF PRISONS, ASSAM. SHILLONG, ASSAM SECRETARIAT PRESS. PRICE RE. 1.

THIS report is of not inconsiderable interest. In reports for previous years the Inspector-General has commented on the unsuitable character of many of the jail buildings, and the difficulty of ensuring the proper care of the health of the prisoners under such circumstances. The report for 1925 appears to give point to the previous reports, for the death rate per mille of prisoners rose from 19.51 in 1924 to 29.85 in 1925. This appears, on the face of it, rather bad, and in the covering Government resolution to the report serious concern at this result is expressed. Matters, however, are not so bad as would appear at first sight; for an examination of the conditions present shows—to quote the Government covering resolution—“that this unsatisfactory result cannot be ascribed to any general cause, but is due to a concatenation of various causes which unfortunately coincided.” Stripped of verbiage this means that, whilst unsuitable buildings may be a factor in the death rate, the actual increase is due to that bugbear of statisticians, “the error of random sampling.”—as we hope to show later.

The daily average of prisoners of all classes fell from 2,357 in the previous year to 2,278; and the increase in numbers of previous years appears to be now diminishing and matters to be tending to resume a more normal state. Both admissions and discharges showed an increase, but—on the whole there were no special “political” causes at work in the Province during the year to increase the number of those immured. The total accommodation for prisoners showed a decrease from accommodation for 3,318 in the previous year to accommodation for 3,297; this change being chiefly due to the dismantling of small temporary wards in the

Nowgong and Dhubri jails. The number of juvenile offenders showed a welcome decrease, and only two prisoners under the age of 16 years were admitted. One of these was 12 years of age, and it is satisfactory to note that—although he was originally sentenced to one year’s rigorous imprisonment—he was sent to the Reformatory School at Hazaribagh, and not to some central jail. The number of female prisoners sentenced during the year was 55 as against 80 in the previous years, whilst short term sentences showed a marked decrease,—a decrease which has been steadily maintained over the past three years. Thus it will be seen that the repeated representations of the Inspector-General have had some effect, and that these three old standing evils are being remedied.

The number of civil prisoners during the year was 68 admitted, 4 from the previous year, and 5 discharged. (Many of these are debtors, etc.). There was only one “State”—i.e., political—prisoner during the year. The number of habitual offenders however was much the same as usual; 70 prisoners admitted during the year had had three or more previous convictions. It is difficult to know how to deal with this class of prisoner. Special religious facilities have been provided throughout the jails of the province for all prisoners, but the habitual remains unaffected. What *would* help—Colonel Bensley considers—would be an efficient Prisoners’ Aid Society which would take these men on their discharge from jail, care for them, look after them and try to make good citizens of them. There is no obstacle to such a scheme; in the covering Government resolution Government expresses its willingness to help financially or otherwise any such society which is placed on a satisfactory basis, whilst questions have been asked in the Legislative Council. Given someone to take the initiative, such a society may come into being.

Discipline on the whole was good; there was a further diminution in the number of jail offences and a further increase in the number of special remissions granted for the non-commission of jail offences. There were seven escapes during the year, but as seven prisoners who had previously escaped were re-captured during the year, one figure may be set against the other. Moheswar Ali, habitual criminal, and noted notorious jail-breaker escaped from Tezpur jail—undoubtedly with the connivance of his guard, but he only had a week’s run of liberty and was recaptured on Christmas day.

Whilst structural arrangements do not yet fully admit of habituais being segregated from first offenders, yet a beginning has been made in drafting B class prisoners from the smaller district and subsidiary jails to the bigger jails at Sylhet, Gauhati and Tezpur, where separated accommodation exists. A sum of Rs. 32,000 has also been voted in the current year’s budget for structural alterations in the more important jails and it is hoped that substantial progress may be made within the next few years in segregating the habitual and “infective” prisoner from the first offender or “susceptible” subject.

The chief feature in the report is the increase of sickness and mortality shewn when compared with the figures for 1922, 1923, and 1924—(but not for years previous to these dates). This increase is taken very seriously by both the Inspector-General and in the covering Government resolution. If we come to analyse the figures however, the differences do not appear so startling as would appear at first sight. Thus in 1924 there occurred 46 deaths and 1,710 admissions to hospital from a population which averaged a daily strength of 2,357 persons; in 1925 there occurred 68 deaths and 1,811 admissions to hospital from a population which averaged a daily strength of 2,278. The daily average sick rate rose from 29.48 in the former year to 35.49 in 1925; and the death rate from 19.51 per mille to 29.83.

If we come to analyse the figures however, we find that the main cause for this increased mortality and morbidity lies in the fact that certain jails shewed admission of patients who were already in bad or indifferent health. Thus at Gauhati there were 13 deaths as against a previous 7 in the previous year; 3 of these

were admitted as advanced cases of tuberculosis; 5 suffering from dysentery, and 2 from kala-azar. At Shillong one patient with dysentery and one with malaria were admitted and both had to be placed in the convalescent gang upon admission to the jail. At Jorhat 2 prisoners died of tuberculosis—one of whom had a family history of the disease and apparently contracted the disease in the jail itself; and a third debilitated elderly convict of pneumonia. At Tezpur an influenza epidemic carried off 3 prisoners straight away and probably reduced the stamina of others. Of 15 deaths which occurred, in the year, 6 took place within a month of admission to jail—probably from diseases previously contracted; and 2 within 2 months of admission. Dibrugarh jail also shewed the deaths of 2 under-trial prisoners from influenza within a month of their admission and also of two others due to an epidemic of influenza within the jail.

In brief, the figures may almost certainly be put down as the results of "random sampling." In 1924 the prisoners admitted were probably—on the whole—healthy; in 1925 they were certainly on the whole a less healthy collection. And one big outstanding finding for the whole year stands out; the great importance of pulmonary tuberculosis as a cause of death amongst jail prisoners in India,—(as also amongst residents in Indian cities and *purdahnashin* women). This disease accounted directly for 11 of the 68 deaths recorded during the year, whilst pneumonia—in some instances at least probably secondary to pulmonary tuberculosis—accounted for a further 11 deaths. In other words it is possible to control jail sanitation that hookworm infection, dysentery, cholera, and the different water-borne and carrier-borne diseases are controlled; but respiratory diseases present a particularly difficult problem. And here it is gratifying to note the opening at the Gauhati jail of a special tuberculosis ward with accommodation for 8 persons. A similar ward will soon be provided in the Tezpur jail.

Financially the total expenditure of the department during the year was Rs. 3,45,710—or an average of Rs. 151-12-1 per prisoner. Cash earnings from prisoners' work however reduced the latter figure to Rs. 121-14-7 per head. Since the close of the year reported on, the covering government resolution reports that several reforms have been sanctioned with the object of improving the conditions of service among the jailors and warders, and of relieving the strain imposed on the staff by night duty.

KALIMPONG MEDICAL MISSION. ANNUAL REPORT FOR 1925. BY J. A. MACDONALD SMITH, M.B., Ch.B., F.R.C.S.E.

This admirably illustrated little report is full of interest and shews what excellent work is being done in a somewhat out of the way district. The patients come from Sikkim, Bhutan, Tibet and Nepal—and have often travelled great distances to the hospital; whilst others come from the plains. The year is reported to have been free from any kind of epidemic; in-patients treated numbered 1,427 and out-patients 10,506. The surgical work at the hospital continues to grow, and the year was noticeable in the number of cases of fractures and other accidental injuries admitted,—largely as a result of the making of a new motor road between Kalimpong and the railway. Malaria is rife and accounted for about a quarter of the admissions; intestinal parasites are so exceedingly common among the adjoining hill tribes that every in-patient's stools are examined as a matter of routine and intestinal helminthic infections cleared. Dr. Macdonald Smith reports favourably on the use of carbon tetrachloride, which he regards as more efficacious than chenopodium and much cheaper.

A matter of surprise is that, whilst the number of in-patients has steadily increased year by year, that of out-patients is less than was the case some years previously. This however is not unsatisfactory, as it is always difficult to properly treat patients from the hill tracts as out-patients. The hospital runs three branch

dispensaries at Nimhong, Tode and Teesta, the last named being open daily. The medical block of the main hospital was thoroughly overhauled and renovated during the year, the private wards for Indian patients were re-modelled, and two new wards for venereal diseases were built in the grounds. A still more important development is the decision to have a small leper settlement in connection with the hospital. An ideal site of 24 acres of hillside has been secured on an isolated spur jutting out into the Teesta valley, a ward has been built, huts erected and estimates drawn up for erecting separate cottages for infectious and non-infectious cases, for men and women, and for leper children. The site will give ample scope for gardening and recreation for the patients. Leprosy appears to be a special problem in the hill States of Bhutan, Sikkim, Nepal and Tibet; owing to the dirty habits of the hill tribes, their severe and rigorous winters when whole households are crowded together into unventilated huts. The States of both Sikkim and Bhutan have sought help in this matter from the hospital, and situated as it is on the North-East Frontier at the entrance to India from these States, it is necessary that the hospital should serve as a line of defence against the importation of lepers from these States into India.

The whole little brochure is illustrated with delightful photographs, shewing the picturesque surroundings of Kalimpong and the attractive type of hospital buildings erected. The work at Kalimpong is clearly in a very flourishing state.

Correspondence.

PENILE ORNAMENTS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to Dr. Sansom's notes in your issue for June 1926, p. 283, on the Dyak "pallang" and his query as to whether penile ornaments are worn in other countries, I am indebted to Mr. L. F. Paget, a tea planting friend for the following notes:—

The Tankhul Nagas of North Manipur assume at puberty as their "toga virilis" a ring of bone or bamboo, through which the prepuce is tightly drawn. This at first is extremely painful, but the penis afterwards adapts itself to the ring, assuming a peculiar shape. It is only removed after marriage and at night when the wife wears it on her finger.

Its object is said to be the promotion of later marriage, as in this tribe the married son automatically takes over most of his father's property.

Colonel McCulloch (an authority on Assam) remarks that the late marriage theory seems to be a very lame one, and can only be supposed to act by rendering sexual excitement very painful and thus diverting the young Naga's thoughts and energies to raiding and the chase, and would thus perhaps tend to postpone the date when the youngster brings a woman into the house, and takes over his father's goods and the chief place in the household.

The Nagas themselves have no other explanation to offer, and while regarded as a sign of manhood, the ring is not considered artistic or ornamental.

On the other hand tribes such as the Sema Nagas, where the young man on marriage branches out afresh, instead of dispossessing the old folk, do not wear the ring, and moreover lead very immoral lives before marriage, which would seem to lend some support to this theory.

Dr. Sansom would perhaps trace this also to a survival of the old phallic worship.—Yours, etc.,

F. C. McCOMBIE, M.D., B.S. (Lond.),
D.T.M. & H. (Camb.).

MEDDOJAN, CHABUA,
P. O., ASSAM,
4th July, 1926.

SUGGESTION IN GENERAL PRACTICE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—With reference to the above subject, I should like to place on record two recent cases in which ordinary treatment completely failed, and which were immediately relieved and rapidly cured by mental suggestion in the waking state.

Case 1. A young man, aged about 30 years, healthy, vigorous, intelligent, well-educated, without any immediate cause that I have yet been able to ascertain, became obsessed with the idea that he was being watched at home and followed in the streets by armed Pathans. This obsession grew rapidly, and when I was called in to certify the patient as insane, I found that he had not left his house for three days, and that he was in a pitiable state of terror. He described to me in great detail the persecution to which he was being subjected, and stated his conviction that his life was forfeit, but insisted that he would be killed in his own house, and therefore would not go into the streets, or to his office. I calmed his fears, made him lie down and close his eyes, and gave some curative suggestions for a few minutes.

He then stood up, declared his head felt better, and looking into the street, said "The Pathans have gone."

Next day, I called again, when he informed me that he felt much better, but that the Pathans had returned in the evening. He stated, however, that they were no longer watching him, but merely kept passing the house. I continued the curative suggestions, and asked him to tear up the resignation of his appointment which he had written. I paid five visits in all. He went out for walks and a motor drive during the week-end, and rejoined his duties on Monday morning, six days after my first visit—to the relief and astonishment of his relatives and friends.

The psycho-analyst might go into the question of "repressed fear," outcropping as the child-terror of the Pathan suggested by an ayah during the patient's early childhood. I am contented with the facts that this man has been restored to his wife and family, and that he met me in the street the other day, saying that I had "lifted a veil from before his eyes" and that he was perfectly happy.

Case 2. A Mahommedan boy, aged 12 years, had been expelled from school some time ago as an incorrigible thief, and was ultimately admitted to a charitable orphanage.

A week ago, he was brought to my office by his father and an official of the orphanage, who stated that it was impossible to keep the boy any longer, as he set a bad example to other boys, stealing everything he could lay hands on, being inattentive in class, idle and mischievous.

I was requested either to certify him as insane or to have him committed to a reformatory. I pointed out to the father that the first step was not justified, and that by the second his child would be sent to consort with actual, or potential criminals; that it would be as wrong to punish the child for stealing, etc., as it would be to punish him for having the headaches of which he continually complained; and that I would do my best to cure him. I gave him four treatments by "suggestion therapy," and, though greatly handicapped by the language difficulty, as he spoke only Hindustani, I had the gratification of securing immediate results—the "headache" disappearing at the first sitting—the boy's own words being "Sir thanda hai!"

I have just received a letter from the secretary of the orphanage stating that the boy has improved considerably—that he was tested with two rupees left on a table to which he had access during five hours, and that he not only resisted the temptation (a hitherto unheard of occurrence) but brought the money to his teacher! The significant remark is added "The headaches of which he always complained have disappeared, and he is attentive and obedient in class."

These cases are typical examples of the tremendous and hitherto neglected power of mental suggestion. Is

it not time that the medical profession put aside prejudice and pre-conceived opinions on the subject of the subconscious, and made full and proper usage of these hidden forces for the alleviation of incalculable misery?—Yours, etc.,

WILLIAM NUNAN, M.D.,
Police Surgeon, Bombay.

9th June, 1926.

SOME POINTS IN SNAKE-BITE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—In your issue of the Gazette for July 1926, p. 370, Dr. Chinal advises against the use of potassium permanganate crystals in snake-bite. Of course, as a caustic, potassium permanganate crystals may produce sloughing but when he says "since venom does not produce sloughing" it may be pointed out that in *Tropical Medicine and Hygiene* by C. W. Daniels, 2nd edition, p. 240, Colonel Alcock writes about the symptoms of cobra-bite as follows:—"In cases that recover, sloughing is restricted to the immediate site of the wound; there is no deep and extensively spreading destruction of tissue." Sloughing therefore may be produced by the venom itself.

Again, with regard to the depth of the incision to be made, Dr. Chinal says "it is quite unnecessary to make incisions except over the punctures only" and recommends massaging the part, but in the same book, p. 247, Colonel Alcock writes: "It must be remembered that the fangs may have been driven in deep, that the venom is injected with force, and that the fine interstices of the areolar tissue exercise capillary attraction, so that the venom may have travelled far from the points of puncture. For these reasons it is a vital matter to make long and deep cuts, to lay the wounds well open, and to let the blood flow and perhaps carry away some of the venom that has lodged."

Colonel Alcock also recommends "a strong solution of permanganate of potash" but not the crystals.—Yours, etc.,

K. C. BANERJEE.

SINI, B. N. RY.,
26th July, 1926.

A CASE FOR DIAGNOSIS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—A patient named Swaru Singh, aged five years, was admitted to this hospital on the 11th June 1926 with symptoms of vesical calculus. His mother informed me that he had previously been operated on by the suprapubic route, at Unna, and two small stones removed.

On the 12th June suprapubic lithotomy was carried out under chloroform anaesthesia. On the usual incision being made, an old-standing sinus leading to the bladder was opened up, and a stone weighing about 3½ drachms removed. The entire operation did not take more than about ten minutes. A hypodermic injection of morphia and atropine was given after operation to induce sleep. The patient seemed comfortable and fell asleep.

At noon on the same day however his temperature suddenly rose to 105°F. An ice cap was applied to his head and cold drinks and a diaphoretic mixture given. By 6 p.m. the temperature fell to 99°F, but he was restless and the pulse weak. A quarter of a c.c. of pituitrin was injected.

On the 13th he was delirious, with slow and irregular pulse, quick and sighing respiration, and the abdomen shrunken and retracted. The temperature was subnormal, and he died at 11 a.m.

During the past three years I have operated on some seventy cases of stone in the bladder and none of them have ever shewn similar symptoms. I have consulted some of my colleagues, one of whom told me that the condition was due to bad quality of the chloroform; another suggests latent malaria awakened into activity

by the operation, a third that the condition was hyperpyrexia due to the very hot weather. Has any of your readers had experience of a similar condition; what was its cause; and is it preventable?—Yours, etc.,

RAJA RAM NAYAR,
Sub-Assistant Surgeon.

CIVIL HOSPITAL,
NANKANA SAHIB, PUNJAB,
22nd June, 1926.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel G. M. Millar, O.B.E., I.M.S., Residency Surgeon, Mewar, is appointed to officiate as Civil Surgeon, Ajmer, and Chief Medical Officer in Rajputana, in addition to his own duties, with effect from the 16th July 1926, and until further orders.

The services of Captain E. C. A. Smith, I.M.S., are placed temporarily at the disposal of the Government of Burma for appointment as Assistant Director of Public Health, with effect from the 11th August 1926.

The undermentioned officers are appointed substantively to the Medical Research Department, with effect from the 1st April 1926:—

Captain R. H. Malone, M.D., I.M.S.

Captain C. de C. Martin, M.B., I.M.S.

The services of Captain P. N. Basu, M.B., I.M.S., are placed temporarily at the disposal of the Government of Madras, with effect from the 27th July 1926.

Captain R. M. Kharegat, Indian Medical Service, an officiating Agency Surgeon, on return from leave, is posted as Civil Surgeon, Ajmer, with effect from the 2nd August 1926.

The undermentioned gentlemen to be temporary Lieutenant, subject to His Majesty's approval:—

Chandiram Vishindas Ramchandani. Dated 29th July 1926.

Ephraim Benjamin. Dated 16th July 1926.

LEAVE.

Lieutenant-Colonel J. W. Watson, C.I.E., I.M.S., an Agency Surgeon, is granted leave on average pay for 3 months and 25 days under the Fundamental Rules, with effect from the 16th July 1926.

PROMOTIONS.

Major (Bt.-Lieutenant-Colonel) (now Lieutenant-Colonel) W. H. Hamilton, C.I.E., C.B.E., D.S.O., F.R.C.S., I.M.S., is granted the temporary rank of Colonel from 3rd July 1919 to 8th March 1921, and is granted the temporary rank of Lieutenant-Colonel from 9th March 1921 to 31st March 1922, whilst holding appointments with the Mesopotamian Expeditionary Force.

The undermentioned Lieutenant-Colonels to be Bt.-Colonels from 1st July 1926:—

A. W. M. Harvey, M.B., I.M.S.

Major (now Lieut.-Col.) W. H. Hamilton, C.I.E., C.B.E., D.S.O., F.R.C.S., I.M.S., is granted the temporary rank of Lieutenant-Colonel from 29th July 1916 to 2nd July 1919.

Major to be Lieutenant-Colonel.

Charles Richard O'Brien, M.B., dated 1st September 1925 (Army Department Notification No. 314, dated the 26th March 1926, is hereby cancelled).

Captains to be Majors.

Philip Savage. Dated 1st August 1926.

Nilkant Shriram Jatar, D.S.O. Dated 1st August 1926.

Tadepally Shankara Shastri, M.B. Dated 1st August 1926.

Jamal-ud-din, M.B. Dated 1st August 1926.

Joseph Henry Smith, M.B. Dated 1st August 1926.

Sorab Dinshah Billimoria. Dated 4th July 1926.

Augustine Sargood Fry, M.B., F.R.C.S.E. Dated 14th August 1926.

Captain (now Lieutenant-Colonel) W. H. Hamilton, C.I.E., C.B.E., D.S.O., F.R.C.S., I.M.S., is granted the temporary rank of Major from 3rd April 1915 to 28th July 1916.

RELINQUISHMENT OF RANK.

Major (temporary Lieutenant-Colonel) Sir Thomas J. Carey-Evans, Kt., M.C., F.R.C.S., I.M.S., relinquishes the temporary rank of Lieutenant-Colonel on vacating an appointment as Surgeon to His Excellency The Viceroy, 29th April 1924.

Major (now Lieutenant-Colonel) W. F. Brayne relinquished the acting rank of Lieutenant-Colonel on ceasing to command an Indian General Hospital. Dated 10th June 1919.

Captain (temporary Major) (now Major) J. A. Sinton, V.C., O.B.E., M.B., I.M.S., relinquishes the temporary rank of Major on vacating an appointment as Deputy Assistant Director of Medical Services, 31st July 1920.

RESIGNATIONS.

The undermentioned officer is permitted to resign his temporary commission, subject to His Majesty's approval:—

Lieutenant Behari Lal Chopra. Dated 2nd July 1926.

RETIREMENT.

Lieutenant-Colonel P. K. Chitale, dated 13th June 1926.

NOTES.

SCHACHT'S MEDICINAL PREPARATIONS.

A CIRCULAR recently to hand, circulated to the medical profession only, details the products issued by the old established and well-known firm of Giles, Schacht and Co., Bristol, England. This firm does not advertise except in medical journals, and the composition of all their products is given. Perhaps the most interesting is Schacht's liquor bismuthi, in which every trace of arsenic, copper, silver, antimony, etc.,—substances which are apt to be found in ordinary liquor bismuthi preparations—has been removed by chemical means. Reports speak of this preparation as not depositing on dilution and as being exceedingly non-irritant. "Bisedia" is a preparation of the firm's liquor bismuthi with pepsin and acid hydrocyanic dil., and has been found to be very valuable in all conditions of acute gastritis. Their "Pepsina liquida" is tested in every instance before issue; it is claimed that one drachm will dissolve 1,000 grains of albumin; and that it is far superior to the pepsin powders of commerce, many of which are not only inert but foetid. It is also claimed that this product will keep for any reasonable length of time, even in bottles only partly filled. "Leniva" is a laxative syrup containing senna, eminently suitable for children. "Ol. morrhuae. phosph., Schacht," "Pancreas liquida. Schacht" and "Emuls. petrolei cinnam., Schacht" are all interesting preparations, the last named being especially rendered palatable by the addition of cinnamon, and tolu. "Syrupi cinchonae alcoholic, Schacht" is an elegant preparation of the total alkaloids of cinchona bark, miscible in all proportions with water, glycerine and dilute mineral acids; each minim of it corresponds to a total alkaloid equivalent of one grain of the bark. The *Lancet* refers to the elegance of preparation and active therapeutic properties of Schacht's preparations: the firm is one which has possessed the confidence of the medical profession for more than two generations, and their products can be relied upon.

THE "HYSTEROSCOPE."

The progress made in recent years in direct ocular examination of the internal viscera of the body is

amazing. The cystoscope has ceased to be a curiosity and is now a commonplace; removal of foreign bodies from the bronchi by the use of the bronchoscope is now a daily practice in many English and American clinics; an instrument has been designed for direct visual examination of the interior of the peritoneal cavity; whilst in a little brochure recently to hand is described the new "Hysteroscope," an instrument manufactured by F. Davidson & Co., 29, Great Portland Street, London, W. to the specification of Dr. H. F. Seymour, M.B., F.R.C.S., Surgeon to the Sussex Maternity and Women's Hospital, Brighton, for direct visual examination of the interior of the uterus. This instrument may well come to revolutionise gynaecological practice, as direct examination of the uterine mucosa has hitherto been undreamt of. The following is a short account of the instrument, taken from Dr. Seymour's account in the *British Medical Journal* for Dec. 26th, 1925, as subsequently revised by the author:—

"I first began with a tube angled like a uterine sound, to facilitate introduction into the cervix in the usual way. This tube after introduction, was straightened out by a device designed by Messrs. Davidson, which held it fixed in the straight position. The light was at the proximal or ocular end, reflected into the tube, as in one type of sigmoidoscope. With this instrument I obtained some views of the endometrium, but only fleeting ones, as blood oozing out and mucus soon obscured the view.

After the examination of a few cases I soon found that it was unnecessary to have an angled tube, as a straight one is easily introduced after the cervix has been dilated up to 10 or 12 m/m.

The next problem was to get rid of the obscuration of the view by blood and mucus. Constant irrigation by sterile water or saline did not solve the difficulty, as it was found impossible to get rid of air bubbles, which spoil the view. I then thought of continuous suction, as used by Dr. Chevalier Jackson for bronchoscopy. I determined to try a hysteroscope made on the bronchoscope principle.

Messrs. F. Davidson & Co. then made for me such an instrument, well designed for both observation and operation. There are two tubes, heavily nickelled, each 28 cm long, one having a bore of 6 m/m, and the other of 9 m/m. The light is at the distal end, and is furnished by one of the 'Davon' dry batteries. This is placed on fixed terminals in the box, and connected to an ingenious form of rheostat. The latter is essential to the life of the lamps. In the wall of the tube are two channels, one for the rod which carries the light, and one for suction. The edges are rounded off so that there is nothing to scratch the endometrium.

When in use the suction channels are connected by rubber tubing to a bottle with a rubber cork, which is kept at a partial vacuum by means of an electric suction apparatus. I have found the Mennell pump satisfactory; it can be used with any voltage, which is a great convenience. The 9 m/m tube is intended for general use; the smaller (6 m/m) is reserved for the post-climacteric uterus, or for cases where dilatation to over 10 m/m is difficult.

For an endoscopic examination the patient is prepared by placing a glycerin tampon against the cervix for two nights to make it easily dilated. I usually slowly dilate up to 12 m/m. The hysteroscope is then very gently introduced; a swab on a sponge holder is used as an obturator, and prevents the lamp becoming obscured by blood during the passage through the cervical canal. The suction apparatus should be set going previous to the introduction. When the instrument is passed in almost to the fundus, the swab on its holder can be withdrawn, and only introduced again should the lamp become smeared. With the suction apparatus working briskly, the lamp end of the tube only requires swabbing out three or four times during an examination.

A very great improvement has since been made by having suction holes both inside and outside the main tubes. Most blood or mucus not entirely carried away

by the outside holes is evacuated by the inner suction holes before reaching the lamp.

The whole endometrium is then carefully scrutinized by turning the instrument about and by partially withdrawing and reinserting the lighted end. The whole lining of the uterus cannot be seen at once; it has to be examined piecemeal.

I find that the more cases one examines the more one can see. The first time a cystoscope is used it is with very little profit to the observer; and so with the hysteroscope one needs practice to become familiar with the appearances of the endometrium in its functional changes during the menstrual cycle and in its alterations from pathological causes.

So far I have examined some fifteen cases, and have been able to see and remove a large fibroid polypus and diagnose a case of fungous endometritis. I derived great help in removing the polypus by being able to trace up the pedicle to its origin on the anterior uterine wall, near the fundus, and snip it through at the right spot by sight, avoiding buttonholing the uterine wall, which can happen when the weight of the polypus has caused a partial inversion of the uterus. The difference between the appearance of the mucous membrane of the uterus during menstrual life and after the menopause is striking; in the latter case the membrane is much paler and smoother. I have also been able to bring into view the ostium of a Fallopian tube.

I believe endoscopy of the uterus is going to prove useful in diagnosing the uterine causes of genital bleeding, since it can reveal such lesions as glandular hyperplasia of the endometrium, polypi, retained products of conception, chorion-epithelioma, and carcinoma. A piece of tissue can easily be removed for microscopic purposes by direct vision. The diagnostic curettage has often been a disappointment to me and, I am sure, to others. The scrapings removed in this way do not really give the pathologist a fair chance.

The instrument and the method of using it here described have the advantage of extreme simplicity. Uterine endoscopy is in its infancy, but from the limited experience I have had of it I believe that it will be of great use as an aid to diagnosis, and of some therapeutic value also."

The "Davon" hysteroscope is sold at £18-8-6, with spare lamps at 7s. 6d. each, and a hand suction appliance at 15s.

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Original Articles.

TROPICAL TYPHUS.

By WILLIAM FLETCHER, M.D., M.R.C.P.,
and

J. E. LESSLAR, DIPL., Madras,
*From the Institute for Medical Research,
Kuala Lumpur, Federated Malay States.*

A FEVER which closely resembles a mild form of typhus is endemic throughout the Federated Malay States. The symptoms and the course of this disease are the same as those of epidemic typhus and the Weil-Felix reaction is positive, but from an epidemiological point of view there is a sharp distinction. The typhus-like disease of the Malay States does not spread directly from man to man, it does not give rise to epidemics, it is not carried by lice, and persons suffering from it can be treated in the general wards of hospitals without special precautions and without danger to others. The louse-borne epidemic typhus of Europe, on the other hand, is a disease which sometimes spreads like wild-fire, and requires energetic measures for its control.

The disease of which we write is not confined to the Malay States, similar fevers which we believe to be identical with it occur in many parts of the world. We call it tropical typhus because it is a disease of warm climates; when it occurs in a cool country it appears in the spring and disappears in the autumn. Epidemic typhus, on the contrary, is a disease of cold or temperate climates, and when an epidemic breaks out in a hot country it flares up in the winter and dies down in the spring.

A fever which is probably identical with tropical typhus has been recognised in America for many years; it is called Brill's disease, after Dr. Nathan E. Brill,(1) who first described it in 1898. This malady is characterized by a sudden onset, intense headache, injection of the conjunctivæ, a typhoid state, enlargement of the spleen, and a maculopapular eruption which appears on the fifth or sixth day. The fever lasts for a fortnight or less, and then comes down by quick lysis or by crisis. Brill's disease is rarely fatal, it is not contagious, and it does not give rise to epidemics.

Anderson and Goldberger(2) concluded from the results of cross-immunity tests on monkeys that Brill's disease was a mild form of epidemic typhus, but the evidence which they brought forward is not convincing.

In 1910 a similar disease was reported by Smithson as occurring among labourers who worked in the sugar-cane fields of tropical Queensland. Smithson(3) suggested that the

disease was conveyed by some insect which lived among the sugar-canes.

In the same year, Conor and Bruch(4) saw several cases of fever in the environs of Tunis which they thought resembled Brill's disease. It began abruptly with rigors, severe headache and a fever which lasted for fourteen days. An eruption of slightly raised macules appeared on the fifth day or earlier; the eyes were injected and the spleen was enlarged. None of the cases ended fatally.

In 1911 MacNaught(5) described a fever in South Africa, the prominent features of which were the same as those of Brill's disease, namely, a sudden onset with intense headache, suffused eyes, and a maculo-papular eruption which came out on the fifth day. The fever terminated at the end of fourteen days by rapid lysis or crisis. It was not contagious, and none of the patients died.

A paper published by Megaw(6) in 1921 aroused fresh interest in the disease. He drew attention to a sporadic and localized form of typhus-like fever in the Kumaon district of the Himalayas, which had been investigated by McKechnie some years before. The average duration of the fever was about twelve days, and at the end of this period there was the same sudden and remarkable change for the better which occurs in epidemic typhus and in Brill's disease. The congestion of the face and eyes at the beginning of the fever, the extensive rash appearing on the fifth day, the mental condition, the bronchitis and rapid breathing; all these, which are the common symptoms both of epidemic typhus and of Brill's disease, were observed by McKechnie in the Kumaon fever. Where it differed from epidemic typhus was in its epidemiology; in this respect it resembled Brill's disease, for it was strictly local in its distribution, it did not give rise to epidemics, it was not easily conveyed to others, and there was a pronounced tendency for the disease to attack only a single individual in a household. There was no evidence that the disease was carried by lice; it affected the well-to-do Europeans rather than the poor Indians. The occurrence of the disease in bungalows near the jungle, rather than in those on cultivated land, suggested to Megaw that the virus might be carried by ticks, an idea which he was the more ready to entertain because he had suffered from an attack of the disease himself twenty days after being bitten by one.

More recently, Megaw,(7) in conjunction with Shettle and Roy, reported a small outbreak at a military camp in Central India. Major Shettle saw fourteen cases in British soldiers and two in Indians. The disease did not spread direct from man to man, no other occupants of any tent in which a case occurred were attacked, and no lice were found on any of the patients.

Since Megaw drew renewed attention to this disease, or group of diseases, its occurrence has been reported from many parts of the world; from Alabama,(8) Adelaide,(9) Mexico,(10) East Africa,(11) and from Toowoomba in Queensland(12). In each instance the disease was characterized by fever which came on suddenly with headache and injection of the conjunctivæ: there was also a typhus-like eruption which came out on the fifth or sixth day. The temperature fell abruptly on about the fourteenth day. Body-lice were not associated with the disease. It was not contagious, nor did it occur in epidemics. The Weil-Felix reaction was positive in all these cases except those in East Africa, and there the cultures of *B. proteus* x 19 were at fault.

The history of the disease in Australia gives a clue to the source of the virus and the means through which man becomes infected with tropical typhus. In the outbreak in the neighbourhood of Adelaide, which was described by Hone,(9) labourers working on wheat-stacks were particularly prone to infection. The Toowoomba cases reported by Wheatland(12) were associated with a plague of mice. Many of the victims of the disease came from farms which were overrun with mice, others were men whose work brought them in contact with grain. It is well known that the parasites of rats and mice are frequently carried from place to place in corn, wheat and other grains, and Wheatland attributed the disease to some ectoparasite of the mouse.

In the Malay States, tropical typhus is as common as typhoid fever and hardly a week passes without two or three cases coming to our notice in the laboratory. In countries which have a cool winter it is a disease of the summer months, but Kuala Lumpur, the capital of the Malay States, is but four degrees north of the equator, the mean temperature is about 84°F., there is no appreciable seasonal variation, and tropical typhus is not more prevalent at one time of the year than it is at another.

The symptoms of the Malayan disease are the same as those of epidemic typhus or of Brill's disease. The onset is sudden, usually with chills, and sometimes with vomiting or an attack of sneezing. The conjunctivæ are injected and there is nearly always a dry cough. Headache is severe and persistent. The temperature rises rapidly, there is marked prostration, the severe headache prevents the patient from sleeping and, in a case of severity, he passes into a typhoid state towards the end of the first week. He becomes tremulous, muttering and restless. Delirium is present in about 35 per cent of cases; in milder cases there is none, except perhaps at night, but the patient's mind seems to be clouded, so that he replies to a simple question

with effort and delay. The disease develops rapidly, more rapidly than typhoid fever, and by the end of the first week the fever is at its height. The temperature at this time is about 104°F. and the pulse 120. The respirations are rapid and sometimes the lungs are full of coarse crepitations. The patient often looks desperately ill, but, suddenly, on about the fourteenth day, there is a great change, the temperature falls, and with the fall all the symptoms disappear. He becomes marvellously better and makes a rapid recovery. The fever terminates by crisis in about 40 per cent and by quick lysis in the remainder, unless it be prolonged by broncho-pneumonia or septic conditions. The spleen is frequently enlarged and so also are the lymphatic glands. The knee-jerks may be lost in the second week and sometimes there is slight deafness. A rash, which appears on about the fifth day, is present in about 40 per cent of the cases, but it is well marked and conspicuous in very few, and it is difficult to see on the skin of a dark Asiatic. It usually consists of dusky macules which have a tendency to become purpuric. We have seen two cases in Europeans where the rash bore a striking resemblance to the macular rash of secondary syphilis. As a rule, the rash is confined to the back, chest, upper arms and thighs, but it may be general in its distribution, except for the face. Sometimes the spots resemble the roseola of typhoid fever. In Asiatics there may be no rash at all, and it usually requires a careful search to find the macules. Bronchitis is so common that it may be regarded as a symptom rather than a complication. Occasionally there is severe broncho-pneumonia. The patients are very liable to bedsores. Apart from this we have seen no complications or sequelæ; convalescence is extremely rapid and there are no relapses.

There have been five deaths among the first hundred cases which have come to our notice in the Malay States. We were not able to visit these five patients ourselves and no post-mortem examinations were made.

The Weil-Felix reaction is always positive in the tropical typhus of the Malay States, but very often it does not become so until the end of the second week. That is to say, it may be negative throughout the course of the fever and became positive only after the temperature has gone down. Repeated examinations should be made in each case and the agglutination curve plotted. As the result of a large number of control tests, we have adopted a serum dilution of 1 in 200 as the limit above which we regard agglutination as positive evidence. The tests are made in Wright's pipettes with emulsions of living cultures which are prepared by washing off the twenty-four hours' growth from agar slopes with distilled water. The serum

dilutions are made with normal saline. The results are read after two hours in the incubator at 37°C.

Van Loghem (13) classified *B. proteus* in two groups, the *Indologenes* group which produce indol, and the *An-indologenes* group which does not. We have employed in the Weil-Felix reaction one an-idologenic strain of *B. proteus* x 19, which is known as the "Kingsbury" strain, and also several indologenic strains. By this means we have found that there are two groups of tropical typhus, clear cut and distinct from one another. One group, which we call the K group, agglutinates the an-indologenic strain "Kingsbury," but it does not agglutinate the indologenic strains, such as "Warsaw" and No. 67 from the National Collection of Type Cultures. The second group, which we call group W., agglutinates the indologenic strains, but does not agglutinate the an-indologenic strain. In neither group is there any evidence of transmission by lice.

The tropical typhus of the Malay States has a special tendency to attack cattle-keepers and those whose occupations take them into waste land covered with grass and undergrowth where cattle graze. Drivers of bullock-carts, cowherds and agricultural labourers, are particularly liable to the disease. The town-dwellers, and the Chinese who work in the tin-mines, escape infection almost entirely. No body-lice have been found on any of the patients and there is the strongest evidence that these insects are not the vectors. Though the disease is not contagious in the sense that it spreads directly from man to man, it has a patchy distribution and preponderates in certain districts.

We have already mentioned Megaw's hypothesis that the disease is carried by ticks, and the evidence from Australia that it is associated with a parasite of the rat. This is supported by our experience in Malaya, and it seems probable, in the latter country at least, that the disease is carried by a mite or tick that spends a part of its existence on cattle and a part on rodents. Where there are cattle there are usually rats, and there were large numbers of them in some of the places in the Malay States where cases of tropical typhus occurred. None of the patients whom we have seen suffering from tropical typhus had any recollection of being bitten by ticks or mites, but the larval forms are very minute and easily escape notice.

We have not been able to maintain the virus of tropical typhus in guinea-pigs, and other observers have been equally unsuccessful. Until a susceptible animal is found, little more can be done to elucidate the aetiology of the disease.

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A FEW "DON'TS" IN OPHTHALMIC WORK.

By F. F. STROTHER SMITH,

MAJOR, I.M.S.,

Sialkot, Punjab.

I MAKE no excuse for writing the following notes on the above subject. It is only too often the case that books and journals on ophthalmology and other subjects tell us "what we should do" but refrain from telling us "what we ought not to do."

The following notes are written in the hope that they will be of benefit to the beginner and the surgeon who has to do an amount of ophthalmic work as part of his routine work:—

(1) *Don't* attempt to perform a cataract operation—and especially intracapsular one—without having had previous training under the guidance of a competent ophthalmic surgeon.

It is not sufficient to stand beside the operation table and watch a surgeon operate on a large number of cases. You must perform the operation yourself several times under his guidance.

I think it is true to say that a pupil may watch a surgeon perform a hundred intracapsular extractions and when asked to operate on the next case may show a total want of observation of what he has seen, and consequently fail.

The best method of training a beginner, in the author's opinion, is to begin by allowing him to make the incision only, and when he has mastered this step, allow him to do the iridectomy; then lastly, the expression of the lens and replacement of the iris. When he has mastered each step separately, then allow him to proceed and do the complete operation. In this way the beginner is more likely to get confidence in himself and, I

may add, that confidence in one's ability to perform an ophthalmic operation is the greatest asset to the ophthalmic surgeon.

It is one of the greatest surgical crimes for a beginner to attempt a cataract operation without the necessary training. There are far too many eyes lost in this way in India.

A beginner may remove an appendix or amputate a leg and do so with great skill, but not so a cataract operation which is such a highly technical job where every detail of the operation is of the highest importance.

(2) *Don't* give a general anæsthetic for a cataract operation except to a patient under 18 years of age.

The chief dangers of a general anæsthetic are:—

(a) Nausea and vomiting with a consequent escape of vitreous and prolapse of the iris.

(b) Expulsive hæmorrhage.

Under 18 years of age it is only necessary to make a small incision because there is no nucleus in the lens up to this age and the expression of the lens substance is easy through a small incision.

Also there is a great difficulty in getting a patient under this age to submit to any operation on the eye without a general anæsthetic.

In a highly "strung" patient over 18 years of age, there are many ways of getting their nerves under control. I have found that large doses of bromide of sodium exercise a very soothing effect on the patient's nerves and self-control.

I have found it useless to give one large dose of bromide an hour or so before the operation. In many cases it produces an exaggerated condition of loss of control.

The best method is to give 30 grains three times a day for two days before the operation and none on the morning of the operation.

If it is impossible to wait two days, then it is better to give one large dose of 90 grains to 120 grains according to the weight and size of the patient, the night before operation.

Opium should not be given in any form, as it very often causes nausea and vomiting. Many patients become very nervous and lose their self-control through unnecessary meddling on the part of the surgeon and his staff.

(3) *Don't* meddle with the patient before cataract operation. By this I mean, do not allow the patient to suffer an unnecessary amount of preparation before the operation. A good patient being constantly reminded of the operation for several hours before the operation by having eyebrows and eyelashes shaved, fomentations applied, and cocaine and adrenaline dropped in the eye every quarter of an hour for at least an hour before the operation, becomes a very nervous patient and may completely lose her self-control.

By all means examine the nose, lachrymal sac, and the lids, and if any signs of inflammation,

etc., are present, the proper treatment must be adopted.

Having decided to operate, put a couple of drops of 5 per cent. cocaine hydrochloride in the eye once only and after three or four minutes the operation can be started. Wash the skin around the eye and of the lids with pure electrolytic chlorine and dry carefully with a sterile swab. Clip a few of the outer lashes of the upper lid in order to allow the knife to pass without touching them; douche the conjunctival sac with 1:3,000 mercury perchloride solution and proceed in the usual way without giving any directions to the patient. You will invariably find that the best behaved patients are poor, ignorant, badly fed people. They come to you for sight. They ask no question, and they do not care one atom what the disease is they are suffering from. They invariably ask you the question, "Can you give me sight?" If you say "Yes," no further questions are asked, and for your part I contend that the less you worry the patient with an extravagant preparation and a lot of questions the better. The worst patient is usually a highly-strung Anglo-Indian who has been brooding over his or her malady for many months and when worked up to operation pitch suddenly loses all self-control.

There is little doubt that a prolonged preparation resulting in a nervous patient is one of the chief causes of vitreous prolapse.

I have heard it said that to operate without a prolonged preparation is slipshod surgery. It is *not*. Our results prove it.

I have gone into this matter the more fully because I have seen so many accidents occur from giving unnecessary directions to the patient. In doing the intracapsular operation the patient should on no account be told to look down while the lens is being expressed. Vitreous escape is much more likely to occur while the patient is looking down.

(4) If a patient has got cataract in one eye only and good vision in the other eye *don't* remove the cataract until the other eye has become cataractous to such an extent that the patient has difficulty in performing his work. It is very rare for cataract to develop in one eye only, unless of course it is traumatic. The usual sequence of events is for one lens to become cataractous a few months before the other. In some cases it may be 4 or 5 years before the second lens becomes cataractous. If you remove the unilateral cataract you will find it impossible to balance the vision in the two eyes, in other words to produce binocular vision. The patient will continue to use the unoperated-on eye and will inform you that unless the eye you have operated on is kept closed the sight is not so good and he sees double. He in fact thinks you have done a poor operation. There is nearly always an accompanying squint which further complicates matters. A European patient had a cataract removed by me just 18 months

ago from her right eye. At the time the left eye was becoming cataractous, a central opacity (small) with a few striæ being seen with the ophthalmoscope. As I was going home on 8 months' leave I decided to operate, telling the patient that until she got proper glasses the sight in the unoperated-on eye would be the stronger. I have recently seen this patient and I have found the central opacity and striæ in the left eye just the same as 18 months ago. She complains that she can get no glasses to produce binocular vision and must close one eye before reading. I have given her a frosted slip of glass which can be placed over the lens in front of each eye in turn. She has excellent sight in the operated eye; she can read JII with a $\begin{matrix} +1.50 \text{ spherical} \\ +2.00 \text{ cylinder at correct angle} \end{matrix}$.

The only exception to this should be:—

If the other lens does not become cataractous and the cataractous eye shows signs of atrophy of the retina.

(5) Don't mistake a case of chronic glaucoma because there is no pain present. It is commoner than most people think to find cases of chronic glaucoma with no pain in the eye or around the eye. Contraction of the field of vision is a much more important point to go by and this contraction is chiefly in the nasal field at the beginning. During the present year I have seen two cases of chronic glaucoma with no pain, but with well marked contraction of the field of vision and well marked cupping of the disc.

Chronic glaucoma has four cardinal signs. (a) Pain, usually in the temporal region; (b) contraction of the field of vision, nasal to begin with and general afterwards; (c) cupping of the optic disc; (d) dilated, sluggish, or immobile pupils. Only one of these may be absent, namely pain. In exophthalmic goitre there are four cardinal signs but any one may be absent and still the case be one of exophthalmic goitre. Not so in chronic glaucoma; pain only may be absent. Pain, however, is usually present at some time or other.

(6) Don't persist in treating a case of glaucoma with eserine because the pain has been relieved; eserine will never cure a case of glaucoma. It will only relieve the symptoms by contracting the pupils and reducing the tension. An operation must take place sooner or later.

I have seen patients who have been treated for a considerable time by eserine drops and all the while contraction of the field of vision had been taking place. No sooner has chronic glaucoma been recognised than the operation of either trephining or some form of iridectomy should be performed.

The results of operation are so good that it must be done at once and the patient should be very strongly advised to undergo operation at once and not continue treatment by eserine. Although the pain is relieved and sight improved by it, it is only temporary.

(7) Don't overdo the treatment of chronic trachoma by applying strong solutions of silver nitrate or pure cupri sulphas too often.

I have seen many cases lately where strong solutions of silver nitrate have been applied every day or every alternate day for a month or more. The result of this severe treatment is invariably cicatrization of the palpebral conjunctiva and resulting entropion. In mild cases it is usually only necessary to brush the under-surface of both lids with silver nitrate solution, 60 grs. to one oz., on alternate days for three applications. It is better to stop the applications after the third and allow the irritation to settle down, at the same time douching out the conjunctival sac morning and evening with a strong solution of magnesium sulphate, say 60 grs. to one oz. At the end of a week any remaining patches of granules can be dealt with. (See below.) It is advisable after the silver nitrate treatment is concluded to apply a little weak ointment of hydrarg. oxidi flav., say 4 grs. to one oz., and massage into the under-surface of both lids. This softens the conjunctiva and helps to prevent entropion.

In severe cases it is better to roll out granules with one of the various roller forceps. After rolling out, dry the bleeding surface with a sterile swab and cocaineise again. Then brush the raw surface with silver nitrate, 60 grs. to one oz. Wash out the conjunctival sac twice daily with sublimate lotion or with magnesium sulphate lotion. Inspect again at the end of a week and brush any granules found with silver nitrate solution. If many applications of silver nitrate are necessary it is advisable to give the patient a week's rest from all silver nitrate treatment after every four applications.

During the interval a little yellow oxide of mercury ointment, 4 grs. to one oz. placed on the under-surface of the lids and massaged into the palpebral surface will help to keep the conjunctiva free from cicatrization. During the present week I have operated on two cases of entropion due to over-treatment by silver nitrate.

THE RESULTS OF BISMUTH TREATMENT IN SEVEN HUNDRED CASES OF SYPHILIS.

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SINCE 1922 innumerable preparations of bismuth have been put upon the market. I have used throughout these years mostly "Neo-Trepol," but have also tried Bismostab, Bicrol, Oleo-Bi, Quinby, Muthanol and Spirillan.

The results of treatment on seven hundred cases may be divided into three periods.

Period I. 1922 and 1923, cases 300.

Period II. 1924, cases 204.

Period III. 1925, cases 198.

The technique adopted was to give intramuscular injections, preferably into the buttocks. The other site chosen was the deltoid in well-developed persons.

First Period, 1922 to 1923.—Weekly injections of bismuth were started, beginning with 1 c.c. for the first two injections, the rest of the injections given being 2 c.c. each. Each course consisted of 2 grms. of bismuth, whatever the preparation used. The preparation mostly used in the cases mentioned below was Neo-Trepol. This preparation contains 96 per cent. of bismuth precipitated from tarto-bismuthate of potassium and sodium, and is put on the market by the Anglo-French Drug Co., Ltd.

The 300 cases in this period consisted of:—

148 cases of primary syphilis; class I.

102 cases of cutaneous and mucous lesions; class II.

50 cases of tertiary syphilis; class III.

It must here be mentioned that the effect of treatment on the Wassermann reaction was only observed during this period.

Of the 148 cases of class I, most of them were in the early stage. Some had already had one or more injections of salvarsan or its derivatives and the rest were cases who had come for treatment after a lapse of time.

For convenience class I is divided into 3 types:—

Type A, early cases	..	..	80
Type B, late cases	..	..	40
Type C, previously treated cases	..	..	28

The serum reaction was only done in 37 out of 80 cases of type "A," in "B" in only 18 cases, and in type "C" in all the 28 cases.

Out of the 25 of type "A" before treatment 13 were sero-negative. These were given two bismuth injections consisting of 1 c.c. each, and later two injections of 2 c.c. The result was sero-negative. After completing the course (2 grms.) the reaction was still negative. These patients were discharged. The 12 other cases showed a feebly positive reaction after the first four injections, so two more injections were given when the result became negative and remained negative after a course of 2 grms.

All the 18 cases in type "B" showed a ++ reaction. A complete course was given and the result was negative in 10 cases, whilst 8 cases were still weakly positive. These 8 cases were given more injections and the result was then negative.

In type "C" no regular effect was found. They had come with a positive Wassermann reaction. After six injections—consisting of roughly 1 gm.—only 3 became negative, while 25 were still positive. After a course of 2 grms., 22 cases gave a negative reaction, but 3 cases continued to remain positive, whereupon another course was given, resulting in a negative reaction.

The destructive effect on the spirochaetes in all these cases was not as well marked as that with arsenic, but the result was fairly good.

Class II, Secondary Cases (102).—These consisted of lesions of the mouth, mucous membranes, and cutaneous syphilides. Here the clinical effect was much better than with arsenic. These cases were all given injections as mentioned above, each course consisting of 2 grms. But after 1 gm. had been administered the lesions cleared and cicatrization took place. The serum reaction was only observed in 22 out of the 102 cases treated. The result was negative after a course of 2 grms. The serum reaction was not observed during the middle of the course, hence I am not in a position to say when the reaction may have changed.

In Class III, Tertiary Cases, various types were handled and the results were much better clinically than in classes I and II. These cases were of not less than 5 years' duration and most of them were of 10 years' duration or above. In only 15 out of the 50 cases was the serum examined, which is a poor number on which to judge. All 15 cases at the end of 2 grms. course were negative.

No toxic effect was observed during this period. No cases of stomatitis or gingivitis were seen, but complaints of pain and nodosities were often reported.

Second Period, 1924.—During this period 204 cases were treated, but no serum reaction was taken, as there were no facilities in the district. From this period onwards the result relied on had to be purely clinical or spiro-nematicidal. The dose of bismuth was also increased and from the beginning 3 c.c. was given per injection. The whole course consisted of 3 grms. of bismuth. These injections were given every four days, with a break of a week after five injections.

Class I. Primary, 64 cases.

Class II. Secondary, 48 cases.

Class III. Tertiary, 80 cases.

Class IV. Congenital 12 cases.

The class I, Primary Cases, are divided into three types:—

Type A, early stage, 20 cases.

Type B, late stage, 39 cases.

Type C, previously treated, 5 cases.

Type A consisted of 20 cases. The sores healed after the second or third injection of bismuth, except in two cases where two more injections were given, making the total 4 injections (1.2 grms.).

The spiro-nema findings usually were negative after the second injection.

In type "B" most of the cases required 3 to 5 injections before the lesions were healed.

In type "C" all 5 cases had had one or more previous injections of "914." The result was negative as far as spiro-nema findings in the sore went. The sores required only two injections of bismuth (0.6 gm.) to heal completely. Here it was observed that the cases treated with arsenic reacted quickly and required fewer injections than those on bismuth.

Class II, secondary cases; consisted of 20 cases

of early syphilitic rashes, mostly nodular and papular types, with a few squamous syphilides; 20 cases of mucous patches of the mouth, throat and cheeks, and condylomata (sessile or vegetating) of the perineum, scrotum, anus or axilla; 8 cases of iritis and interstitial keratitis.

The results were clinically better than in the first period. With the 20 cases of syphilitic rashes the result was much better. Here a course of 3 grms. was given, but the lesions usually cleared up after a total of 1 gm. With the 20 cases of syphilides of mucous membranes the results were much better and they only required 2 or 3 injections. In the eye cases there were 3 instances of iritis. Here the zone of circum-corneal injection was lost after the first injection. The muddiness of the iris was nearly lost after the second injection. In cases of interstitial keratitis the ocular congestion is lost after the first injection and the intra-ocular pressure is relieved. After the third injection the eye becomes almost normal.

Class III, Tertiary Cases; consisted of

- 10 of seriginous lesions.
- 12 of leukoplakia of the tongue.
- 6 of chronic glossitis.
- 20 of ulceration of the tonsils.
- 10 of perforated palate.
- 5 of gumma of the testis.
- 15 of gumma of the bones.
- 2 tabetic cases.

All the above cases reacted to bismuth rapidly and with great speed. In all the above lesions bismuth was as powerful clinically as salvarsan and its derivatives.

Both the tabetic cases were treated with bismuth. One case had combined treatment (As and Bi) and the other was treated only with bismuth. After four injections the gastric crises and lightning pains disappeared and after two more injections all signs had gone, except headaches. I then lost sight of this patient. In the other case a few injections of arsenic were given with the bismuth. The result was not so good, but on pushing bismuth the case showed clinical improvement.

Class IV, congenital cases; consisted of children

- aged 6 months 3 cases.
- aged 1 year 2 "
- aged 2 years 5 "
- aged 5 years 2 "

TOTAL .. 12 cases.

All these children had mostly mucous lesions—mucous patches on the lips, or condylomata, mostly sessile, near the anus. The result with bismuth was very encouraging. In these cases Trepol was used and in those cases where the children were breast-fed, the mothers were also given bismuth injections. The infants between 1 and 2 years were given 1 c.c. intramuscular injections of Trepol. These injections require patience and

care. Two injections are quite adequate to give marked clinical results. Children of 5 years or more were given 1.5 c.c. and these injections were well tolerated. These cases were not followed up, but as far as I could see the clinical results were very good.

Toxic Effects.—In this period the toxic symptoms usually seen were gingivitis and stomatitis, which cleared up with sodium thiosulphate injections. Two cases showed signs of nephritis but stoppage of the treatment for a fortnight was sufficient to allay all symptoms.

Third Period, 1925.—Having seen that 3 c.c. injections of bismuth, i.e., 0.3 gm. of bismuth per injection, had given rise to toxic symptoms, whereas in the first period there were no toxic symptoms, a middle course was adopted and the injections given were 2 c.c. each, the whole course consisting of 2.4 grms.

During the last part of the second period it was noted that all patients after completion of treatment reported that they felt healthier and stronger and they certainly looked so. The weights were taken in each case before and after treatment. The results will be given later.

During this period 198 cases were treated:—

- Class I, Primary .. 48 cases.
- Class II, Secondary .. 78 "
- Class III, Tertiary .. 70 "
- Class IV, Congenital .. 2 "

The treatment for *class I, Primary Cases*, was to give 6 injections of bismuth and continue with another 6 injections after a fortnight's interval. This interval was given to get all the bismuth absorbed from the tissues.

Class I was divided into:—

- Type A, early stage, 18 cases.
- Type B, late stage, 20 cases.
- Type C, previously treated with arsenic, 10 cases.

In type "A" cases the sores almost completely healed after the third injection and the spironema findings were negative after the second and third injections.

In type "B" cases the spironema findings were negative and the ulcer usually required five injections to heal.

Type "C" cases showed negative spironema findings even after the previous injection of arsenic, and the healing of the ulcer only required 2 to 3 injections of bismuth.

Class II, Secondary Cases; consisted of—

- Cutaneous syphilides .. 20 cases.
- Mucous patches .. 36 "
- Condylomata .. 22 "

The best result was seen in cases of mucous patches of the mouth, cheek or palate. The result was as good or even better than with arsenic or its compounds. The condyloma cases showed healing but the result was inferior to that in the cases of mucous patches. The cutaneous syphilides usually required 4 injections

of bismuth. In short, bismuth showed as good results as arsenic if not better in secondary cases.

Class III; Tertiary Cases, consisted of—

Gumma of the skin	..	5	cases.
Gumma of the bone	..	4	"
Gumma of the testis	..	1	"
Perforation of the palate	..	6	"
Chronic glossitis	..	20	"
Leukoplakia of the tongue	..	8	"
Ulcers	..	28	"

As above mentioned the lesions of the mouth and the cases of syphilitic ulcer reacted clinically in a wonderful way to bismuth. In fact the results were better than in similar cases treated with arsenic.

Cases of gumma of the skin, bones and testis did not respond so readily to the bismuth treatment.

Class IV; Congenital Cases.—Both these were children of 3 years. One had ulcers of the scalp and legs and the other mucous patches of the lips and condylomata on the anus. Both were given Trepol, two injections, once a week. The result was relief from symptoms and rapid healing. It was observed that children behave well when treated with bismuth and no toxic symptoms were found, as is so often the case with arsenic.

The weights of all 198 patients were taken before starting the treatment and also at the end of treatment before they were discharged. All cases showed an increase of weight ranging from 3 to 15 lbs., except the three tertiary cases where one showed $\frac{1}{2}$ lb. increase, the second 2 lbs., and the third 1 lb. only. In both the congenital cases there was no increase at all.

CONCLUSIONS.

Bismuth acts indirectly on the spirochaetes through the tissues of the host, whereas arsenic acts directly on the spirochaetes and also to some extent on the host. The direct action on the spirochaetes is found wherever the blood comes into contact with the free spirochaetes. With bismuth the action is deeper. It penetrates all the tissues of the host and then indirectly poisons the spirochaetes. The action of bismuth requires time, but its method of attack is slow and steady.

With bismuth there is a regular and steady bombardment from all sides and there is no chance left for the spirochaetes to seek nooks and corners, for arsenic only kills those that come within the circulatory system. The secretion of bismuth is slow, if metallic bismuth be used, but quicker if soluble preparations are used. Hence the advantage of suspensions over soluble preparations. The long persistence of bismuth in the secretions, indicating its retention in the body, gives strong evidence of bismuth continuing its therapeutic effect for some time even after the termination of a course. Bismuth is excreted by all the excretory organs (gall bladder, bowel, kidneys, sweat glands and breast). This shows

its superiority to arsenic in entering into and penetrating all the tissues.

One fact is important in bismuth therapy, that is, that two or more injections are necessary to get bismuth absorbed in sufficient amount to convert the tissues into an environment lethal to the spirochaetes. In men with primary sores it was observed that bismuth requires at least five or six days to give a negative spirochæma finding, but with arsenic the sores give a negative result within 24 hours.

The conclusions arrived at after four years' treatment of syphilis with bismuth are as follows:—

1. Bismuth is a valuable drug for the treatment of syphilis and does not fall very short of arsenobenzol in its effect upon all symptoms and upon the serological reactions.

2. In primary cases it is best to start with one or more injections of arsenic and then give a course of bismuth injections. As mentioned above arsenic quickly sterilizes the patient of spirochaetes and bismuth takes some time. Under these circumstances it is best not to wait. The earlier the attack, the easier and quicker the cure.

3. In secondary, tertiary, congenital and latent cases bismuth shows better results than arsenic. Its influence on the Wassermann reaction is quicker and the negative result when once obtained is permanent.

4. Among the secondary and tertiary cases the best results are obtained in cases of mouth lesions (glossitis, leukoplakia, mucous patches, etc.).

5. In eye cases its action is rapid and it does not expose the patients to grave optic lesions.

6. It has a penetrating action, for it is found in the cerebro-spinal fluid. It is nowadays the drug to rely on in meningeal and cortical syphilitic affections of the brain.

7. Wassermann-fast cases often become negative under bismuth treatment.

8. The use of bismuth, unlike that of arsenic, does not expose the patient to risks. Bismuth not only acts as an antileptic but also behaves as a tonic. All patients treated showed increase of weight from 3 to 12 lbs.

9. In syphilitic affections of the heart and circulatory system bismuth is the only drug to fall back on, as it has no bad effect.

10. Among the many bismuth preparations, metallic bismuth is the preparation of choice. Its absorption rate being uniform, its action is steady and no toxic symptoms are observed. The soluble preparations are nearly all wasted in the treatment of syphilis.

11. The method of administration is simple and requires no skill, but stress must be laid on good technique to avoid pain and discomfort.

12. The only danger to avoid with bismuth is not to inject the drug in the blood stream, as it causes paralysis and death within two hours. (1)

REFERENCE.

- (1) Chenoy. *Indian Medical Gazette*, May, 1926.

ON "AGGLUTINATING" AND "NON-AGGLUTINATING" VIBRIOS FOUND IN THE HUMAN INTESTINE AND IN WATER, AND THE RELATIONSHIP BETWEEN THEM.

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IN the course of our investigations into the bacteriology of clinical cholera in the Asansol Mining Settlement during the year 1925, we found as previously reported (*vide Indian Medical Gazette* February 1926, p. 56), that although the year was a record one in its freedom from cholera, ground tanks in the Settlement which were much frequented for washing after defæcation were heavily infested with non-agglutinating vibrios, particularly during the hot dry months of the year (March—June) which is the annual epidemic season of cholera in the Mining Settlement.

These vibrios were proved by us to be directly associated with faecal contamination, for when certain heavily-infested tanks were "closed" by one of us under the Regulations for the Prevention and Control of Cholera in the Asansol Mining Settlement, the vibrios in every instance were found to disappear in from 10—12 days, re-appearing again within 24 hours on the prohibition being withdrawn and bathing and washing being resumed. From this we concluded that a certain proportion of the inhabitants of the Mining Settlement are habitual carriers of non-agglutinating vibrios. On attempting, however, to isolate vibrios from the stools of those frequenting the tanks referred to above by ordinary laboratory methods of cultivation, we were astonished to find that we were unable to do so. Subsequently by the open-bowl method (*Indian Medical Gazette*, February 1926, p. 56) we were able to demonstrate that at least 0.1 per cent. of the inhabitants of the Mining Settlement are habitual carriers of non-agglutinating vibrios.*

* Since writing the above we have found by an improved method of cultivation which we have devised, that at least 30 per cent of the inhabitants of the Mining Settlement are permanent carriers of non-agglutinating vibrios.

The method referred to is as follows:—

1. Each whole stool is thoroughly emulsified in 400 c.c.s. of 1 per cent. saline solution and then allowed to settle for 6 hours in a conical glass.

2. 40 to 50 c.c.s. of the clear supernatant fluid is then poured off into an open enamelled bowl containing 200 c.c.s. of 1 per cent. saline to which has been added 1 c.c. of 1 per cent. peptone solution.

The bowls are kept at room temperature in a dust-proof locker and examined daily for the presence of vibrios for five days by the ordinary peptone-water enrichment process.

This percentage does not in our opinion represent the actual number of carriers, as it is improbable that such a comparatively small number of carriers as this percentage represents could cause such heavy re-infestations of our experimental ground tanks within 24 hours as we have constantly experienced. It would, therefore, appear that vibrios under certain favourable conditions can multiply more freely in Nature than in the laboratory. It should be clearly appreciated that the non-agglutinating vibrios habitually found by us in the water of ground tanks used for washing after defæcation, and in the stools of those frequenting these tanks, differed in no way as judged by laboratory tests from the vibrio of Koch, except in agglutinability. During the rainy and cold seasons of the year vibrios practically disappear from ground tanks in the Mining Settlement, reappearing again each hot weather in great profusion. This phenomenon we attribute to unfavourable climatic conditions during the rainy and cold seasons of the year since the percentage of carriers of non-agglutinating vibrios in the population as judged by laboratory methods remains practically constant throughout the year.

During several small and localised epidemics of cholera—both spontaneous and imported—which occurred in the Settlement during the rainy and cold seasons of the year, we observed that concurrently with the outbreak of the epidemics due in every instance to the vibrio of Koch, the tanks of the infected villages immediately became heavily infested not with agglutinating but with non-agglutinating vibrios, the vibrios disappearing from the tanks in each case as the epidemic subsided. A similar phenomenon has frequently been noted by other observers in connection with epidemics of cholera due to Koch's vibrio in various parts of the world, but the inevitable conclusion that these non-agglutinating vibrios must have been directly and immediately derived from the vibrio of Koch seems never to have been drawn.

Through the assistance of the outdoor staff of the Mines' Board of Health we have been able in a great number of instances regularly to examine the stools of survivors of proven Koch's infection, with a view to ascertaining if infestation generally persists in such cases and if so in what form. Our examinations in this connection have invariably shown that 70 per cent. of such survivors show no vibrios in their stools after two to three weeks, but that the remaining 30 per cent. become "chronic" carriers—not of agglutinating but of non-agglutinating vibrios, the agglutinating vibrio changing in the intestine into the non-agglutinating form after two to three weeks. How long this "carrier" condition may last we are not at present in a position to state, but in several cases now under observation survivors of epidemic outbreaks in 1924 are still passing non-agglutinating vibrios in great numbers in their stools.

A similar phenomenon has been observed by Calalb amongst survivors of the bacillary dysenteries, agglutinating dysentery bacilli changing in the intestines of survivors into non-agglutinating bacilli after a certain period(1).

The alternate loss and acquisition of agglutination has also been recorded by Cunningham in the case of the spirochæte of relapsing fever in Madras(2).

It should be emphasised that in no instance have we ever been able to find agglutinating vibrios in the stools of either survivors or of contact carriers three to four weeks after the cessation of an epidemic.

Stools of proven cases of agglutinating infection grown by us in the laboratory by the open-bowl method frequently showed non-agglutinating vibrios in gradually increasing numbers from the second day onwards, no agglutinating vibrios remaining unchanged in such cases as a rule after the seventh day.

Laboratory cultures of agglutinating vibrios grown by us by the open-bowl method also changed into non-agglutinating vibrios after two to three weeks.

These observations naturally led us to the conclusion that the non-agglutinating form of vibrio is the permanent form in Nature, the agglutinating form being a temporary one found only during epidemics. To put this conclusion to a final test we selected a number of suitable ground tanks proved by frequent examinations to be free from vibrios. Into these tanks we inseminated on various occasions fresh cholera stools subsequently proved by laboratory examination to contain great numbers of agglutinating vibrios. The water of the tanks in which the stools had been inseminated was then examined by us at two-hourly intervals, and in every instance, as will be seen from the accompanying tables, the agglutinating vibrios from the stools changed *en masse* into non-agglutinating vibrios in the tanks between the 12th and the 20th hour after insemination, while laboratory cultures of agglutinating vibrios similarly inseminated into ground tanks also changed into non-agglutinating vibrios between the 34th and the 40th hour after insemination.

We claim, therefore, that it is proved to demonstration that the agglutinating vibrio found in cholera dejecta, and the non-agglutinating vibrio found in carriers and in water contaminated with human fæces are one and the same organism, the characteristic power of agglutinability being one acquired temporarily only in epidemics. Agglutinability is moreover mainly an artificial property developed and fixed by laboratory cultivation, since laboratory cultures of agglutinating vibrios take approximately three times as long as the vibrios in the stools from which they are derived to lose their agglutinability under natural conditions.

The rapid change from the agglutinating form into the non-agglutinating which occurs in Nature accounts for the fact that non-agglutinating

vibrios have been found so constantly associated with outbreaks of cholera due to Koch's vibrio, the agglutinating or epidemic form changing as we have seen under natural conditions in water into the non-agglutinating form in about 14 hours in the climate of Asansol in the dry hot weather (May). In this connection it may be of interest to state that on three occasions only have we been able to isolate agglutinating vibrios from the water of ground tanks known to have been contaminated within the previous 24 hours by epidemic cholera dejecta, the agglutinating vibrio having in all other instances changed into the non-agglutinating form before reaching the laboratory for cultivation.

Non-agglutinating vibrios are moreover pathogenic to man, being found in very constant association with sporadic cholera, a disease in every respect identical with epidemic cholera save only in its (apparently) non-infectious character. In one outbreak recently investigated by us which subsequently proved to be associated with non-agglutinating vibrios four members of one family were suddenly taken ill simultaneously, non-agglutinating vibrios being isolated from the stools of two of them. In this instance it is reasonable to assume that all four cases were infected with a non-agglutinating vibrio from a common though unknown source.

We therefore suggest that non-agglutinating vibrios constitute the reservoir of endemic cholera in Bengal, the non-agglutinating form being changed into the agglutinating under favourable conditions in the human intestine, since it is not unreasonable to assume that a character so transient in its nature may as rapidly be acquired as lost.

During our investigations in the Asansol Mining Settlement we have met with several outbreaks of epidemic cholera in distant and isolated villages the inhabitants of which had not been in contact either recently or remotely with any case of epidemic cholera. Spontaneous outbreaks of epidemic cholera have also been noted by other observers in other localities. Hitherto the explanation of such outbreaks has been that they owed their origin to some "carrier" of Koch's infection who existed unknown in the community. Our suggested explanation of such outbreaks now is that owing to some favouring circumstance the non-agglutinating vibrio changed into the agglutinating or epidemic form in one of the numerous "chronic" carriers of non-agglutinating vibrios in the community, the epidemic spreading in the usual manner by contamination of water and by contact.

A fully-detailed account of these investigations will appear subsequently in the *Indian Journal of Medical Research*.

TANK EXPERIMENT NO. 1.

Several samples of water of Ground Tank No. 1 were examined at intervals for freedom from vibrios by intensive methods of cultivation, and a strict guard was kept throughout on the tank both day and night to prevent pollution.

About 20 c.c. of rice-water stool (Case No. 703) which culturally gave an abundant and a pure growth of Koch's vibrios were thrown into the tank at a particular place, and samples of water from about that place were examined at 2-hourly intervals for vibrios. The serological reaction of each strain was tested against high-titre anti-Koch serum.

Date and hour of inoculation with rice-water stool 8-30 a.m., 15th May, 1926.

No. of the sample.	Date and hour of collection.	Pre- sence or ab- sence of vibrios.	Sero- logical character.
1st sample	15-5-26. 10-30 A.M. (2nd hr.)	+	Agglutinating.
2nd "	" 12-30 P.M. (4th ")	+	"
3rd "	" 2-30 P.M. (6th ")	+	"
4th "	" 4-30 P.M. (8th ")	+	"
5th "	" 6-30 P.M. (10th ")	+	"
6th "	" 8-30 P.M. (12th ")	+	Non-agglutinating.
7th "	" 10-30 P.M. (14th ")	+	"
8th "	16-5-26. 4-30 A.M. (20th ")	+	"
9th "	" 6-30 A.M. (24th ")	+	"

TANK EXPERIMENT NO. 2.

The same as Tank Experiment No. 1, but instead of a rice-water stool, the whole of a 24 hours growth of cholera vibrio (Strain, Case No. 124) on a medium sized agar slope was emulsified in normal saline and thrown at a particular spot into the tank. The subsequent procedure and observations were the same as in Experiment No. 1.

Date and hour of inoculation with a growth of the standard strain of cholera vibrio, 10 a.m., 20th May, 1926.

No. of the sample.	Date and hour of collection.	Pre- sence or ab- sence of vibrios.	Sero- logical character.
1st sample	20-5-26. 12 A.M. (2nd hour)	+	Agglutinating.
2nd "	" 2 P.M. (4th ")	+	"
3rd "	" 4 P.M. (6th ")	+	"
4th "	" 6 P.M. (8th ")	+	"
5th "	" 8 P.M. (10th ")	+	"
6th "	" 10 P.M. (12th ")	+	"
7th "	" 12 P.M. (14th ")	+	"
8th "	21-5-26. 2 A.M. (16th ")	+	"
9th "	" 4 A.M. (18th ")	+	"
10th "	" 6 A.M. (20th ")	+	"
11th "	" 8 A.M. (22nd ")	+	"
12th "	" 10 A.M. (24th ")	+	"
13th "	" 12 A.M. (26th ")	+	"

TANK EXPERIMENT NO. 2—contd.

No. of the sample.	Date and hour of collection.	Pre- sence or ab- sence of vibrios.	Sero- logical character.
14th "	21-5-26. 2 P.M. (28th ")	+	Agglutinating.
15th "	" 4 P.M. (30th ")	+	"
16th "	" 6 P.M. (32nd ")	+	"
17th "	" 8 P.M. (34th ")	+	"
18th "	" 10 P.M. (36th ")	+	"
19th "	22-5-26. 6 A.M. (44th ")	+	"
20th "	" 8 A.M. (46th ")	+	"
21st "	" 10 A.M. (48th ")	+	"
22nd "	" 12 A.M. (50th ")	+	"
23rd "	" 2 P.M. (52nd ")	+	"
24th "	" 4 P.M. (54th ")	+	"
25th "	" 6 P.M. (56th ")	+	"
26th "	" 8 P.M. (58th ")	+	"
27th "	" 10 P.M. (60th ")	+	Non-Agglutinating.
28th "	23-5-26. 6 A.M. (68th ")	+	"
29th "	" 8 A.M. (70th ")	+	"
30th "	" 10 A.M. (72nd ")	+	"

TANK EXPERIMENT NO. 3.

The same as Tank Experiment No. 1, except that samples of water were taken and examined every 4 hours.

Date and hour of inoculation with rice-water stool, 2 p.m., 20th May, 1926.

No. of the sample.	Date and hour of collection.	Pre- sence or ab- sence of vibrios.	Sero- logical character.
1st sample	20-5-26. 6 P.M. (4th hour)	+	Agglutinating.
2nd "	" 10 P.M. (8th ")	+	"
3rd "	21-5-26. 2 A.M. (12th ")	+	"
4th "	" 6 A.M. (16th ")	+	"
5th "	" 10 A.M. (20th ")	+	Non-agglutinating.
6th "	" 2 P.M. (24th ")	+	"
7th "	" 6 P.M. (28th ")	+	"
8th "	" 10 P.M. (32nd ")	+	"

TANK EXPERIMENT NO. 4.

Similar to Tank Experiment No. 2. Samples of water were collected 4-hourly instead of every 2 hours.

TANK EXPERIMENT NO. 4.—*Contd.*

Date and hour of inoculation with the growth of cholera vibrio, 10 a.m., 30th May, 1926.

No. of the sample.	Date and hour of collection.	Pre- sence or absence of vibrios.	Sero- logical character.
1st sample	30-5-26. 2 P.M. (4th hour)	+	Aggluti- nating.
2nd "	" 6 P.M. (8th ")	+	"
3rd "	" 10 P.M. (12th ")	+	"
4th "	31-5-26. 6 A.M. (20th ")	+	"
5th "	" 10 A.M. (24th ")	+	"
6th "	" 2 P.M. (28th ")	+	"
7th "	" 6 P.M. (32nd ")	+	"
8th "	" 10 P.M. (36th ")	+	"
9th "	1-6-26. 6 A.M. (44th ")	+	Non- Aggluti- nating.
10th "	" 10 A.M. (48th ")	+	"
11th "	" 2 P.M. (52nd ")	+	"

TANK EXPERIMENT NO. 5.

Similar to Tank Experiments Nos. 2 and 4. Samples of water were collected as in Experiment No. 4.

Date and hour of inoculation, 12 a.m., 7th June, 1926.

No. of the samples.	Date and hour of collection.	Pre- sence or absence of vibrios.	Sero- logical character.
1st sample	7-6-26. 4 P.M. (4th hour)	+	Aggluti- nating.
2nd "	" 8 P.M. (8th ")	+	"
3rd "	" 12 P.M. (12th ")	+	"
4th "	8-6-26. 6 A.M. (18th ")	+	"
5th "	" 10 A.M. (22nd ")	+	"
6th "	" 2 P.M. (26th ")	+	"
7th "	" 6 P.M. (30th ")	+	"
8th "	" 10 P.M. (34th ")	+	"
9th "	9-6-26. 6 A.M. (42nd ")	+	"
10th "	" 10 A.M. (46th ")	+	"
11th "	" 2 P.M. (50th ")	+	"
12th "	" 6 P.M. (54th ")	+	Non- aggluti- nating.
13th "	" 10 P.M. (58th ")	+	"
14th "	10-6-26. 6 A.M. (66th ")	+	"

TANK EXPERIMENT NO. 6.

Same as Experiments Nos. 2, 4 and 5. Samples of water were collected every 4 hours.

TANK EXPERIMENT NO. 6.—*Contd.*

Date and hour of inoculation, 12 a.m., 15th June, 1926.

No. of the sample.	Date and hour of collection.	Pre- sence or absence of vibrios.	Sero- logical character.
1st sample	15-6-26. 4 P.M. (4th hour)	+	Aggluti- nating.
2nd "	" 8 P.M. (8th ")	+	"
3rd "	" 12 P.M. (12th ")	+	"
4th "	16-6-26. 6 A.M. (18th ")	+	"
5th "	" 10 A.M. (22nd ")	+	"
6th "	" 2 P.M. (26th ")	+	"
7th "	" 6 P.M. (30th ")	+	"
8th "	" 10 P.M. (34th ")	+	Non- aggluti- nating.
9th "	17-6-26. 6 A.M. (42nd ")	+	"
10th "	" 10 A.M. (46th ")	+	"
11th "	" 2 P.M. (50th ")	+	"
12th "	" 6 P.M. (54th ")	+	"
13th "	" 10 P.M. (58th ")	+	"

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TYPES OF MENTAL DISORDER.

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THE classification of mental disorders based on ætiology, such as the one adopted in the official returns of mental hospitals, often gives rise to fallacies because more than one ætiological factor may account for a single case. It is not unusual to find a person with a strong hereditary predisposition to insanity giving a history of indulgence in alcohol or of being addicted to ganja smoking and in whom the Wassermann reaction may be strongly positive and who may ultimately manifest symptoms of dementia præcox. Syphilis and senility are frequent concomitants in a psychotic.

Until we have an undisputed ætiology or pathology of mental diseases, we have to rely on symptoms in order to classify the several cases that are admitted in a mental hospital and the Kræplinian classification appears to be the most practicable one in the present state of our knowledge. Of the 113 cases admitted last year to the Bangalore Asylum, 44 were of the maniac-depressive type, 23 were cases of dementia præcox, 7 of paranoid psychosis, 14 cases of idiocy and imbecility, 4 were confusional states and the remainder not conforming to any of the above types.

In the maniac-depressive type, the maniac phase was more in evidence than the depressed

or the mixed states. During this phase of the disease, morbid elation, restlessness, flight of ideas, garrulity and other evidences of increased psychomotor activity were the characteristic features. Most of these cases are amenable to successful treatment so far as the existing symptoms are concerned, and with the usual remedial measures such as continuous baths, sedatives and good feeding they recover from the attack and are so well mentally as to justify their discharge from the hospital. But as the generally accepted view with regard to the disease is that it is due to a constitutional emotional instability, there is no knowing when a fresh outbreak may occur.

Cases of melancholia are comparatively rare in the series under consideration. Those that were treated were of the simple type exhibiting mild mental depression, psychomotor retardation, without delusions or suicidal tendencies.

A combination of factors which makes diagnosis based mainly on ætiology very difficult is seen in the following case, which from the symptoms would be diagnosed as mania.

Case 1.—K.R., male, aet. 37, admitted 9-1-1925, addicted to alcohol, ganja and opium. Physically exhausted, had slight tremors of hands and lips; knee-jerk absent, pupillary reaction normal and Wassermann test strongly positive. Mentally greatly elated, garrulous, noisy, with flight of ideas and his attention was wandering. Under anti-syphilitic treatment and remedial measures to control his psycho-motor excitement his physical and mental condition improved. But on 22nd of May, he had an apoplectic attack and left hemiplegia which disappeared after 24 hours. He thereafter continued to improve both mentally and physically and gained in weight and his discharge from the hospital was applied for by his relatives. He was however advised to remain in hospital some time longer to finish his course of anti-syphilitic treatment. But on the 22nd of July he had a second apoplectic attack and generalised convulsions to which he succumbed.

Except in the case of general paralysis of the insane, whose causation is now established beyond doubt, it is not easy to say how far the mental symptoms in a syphilitic subject have an organic basis due to the direct effect of the virus on the cerebral centres. There is a great diversity in the manifestations of mental disorder associated with syphilis. They may range from indefinite functional disorders like neurasthenia or a fear of the infection (syphilophobia) and general nervous uneasiness to a complete disorganisation of the psychic life or dementia. It has to be remembered that "the action of the toxin (syphilitic) combined with a careless administration of mercury may in many cases lead to a cachectic condition with trophic changes in the brain and may lead to melancholia or mania, but as a rule lead to rapid dementia" (Overbeck-Wright). Such a condition was noticed in the following case.

Case 2.—V. P., aet. 35, fitter by profession, duration of insanity one year prior to admission on 21-3-1925. He was in a cachectic condition, with dry pigmented

skin. His knee-jerks were absent, speech slurring, and Wassermann test strongly positive. Mentally his power of comprehension was feeble and response to questions was childish, there was neither association of ideas nor reasoning power, memory completely lacking, emotionally he was depressed and his psycho-motor activity restricted to the verbiage of a few meaningless words. In habits he was wet and dirty.

It is the practice in this institution to examine the blood of every patient for the Wassermann reaction and if it is found positive to put the patient through an intensive course of anti-syphilitic treatment, and whether the mental condition be functional or organic, the general bodily improvement that ensues after the anti-syphilitic treatment brings about a marked amelioration of the mental symptoms.

The type of mental disease that excites the greatest interest and which moreover especially taxes the resources of the physician is that of adolescent insanity or dementia præcox. The term "schizophrenia" which means splitting of the personality, is also applied to this type of insanity in preference to "dementia præcox." Two factors operate in the maintenance of a "normal" personality, viz., the innate psychic make-up or the capacity to face the realities of life, and the realities of life themselves. The overwhelming nature of the one or the deficiency of the other may bring about a psychosis. Unfortunately the information furnished with regard to a patient admitted into the hospital is so meagre or unreliable that it is not easy in every case to assess the exact part played by either of these factors. Whatever is put forward as a possible cause of the disease happens to be an initial symptom rather than a cause. The diversity in the symptoms in this type of disease is bewildering and any case is a problem in itself. This is accounted for by the fact that certain split off elements of the personality regress to any of the lower grades of mental development and in advanced cases operate at the vegetative level. The prognostic dictum "the earlier the treatment, the better the prospects of success" applies no less to mental disease than to bodily ailments, and is particularly applicable to schizophrenic conditions. In the series of cases under review the largest percentage of success was among the cases that had developed insanity within six months of their admission to hospital. In the subjoined case of schizophrenia which turned out favourably the mental regression was not very marked and admission was sought within two months of the outbreak of the mental symptoms.

Case 3.—F. B., aged 22, schoolmistress. Possible cause of disease is said to be the death of her elder sister, after which she neglected her work. Her first impulsive act was a quarrel with her headmistress and subsequent symptoms followed in rapid succession. She became incoherent, abusive, sleepless; refused food and became violent and resistive when interfered with. On admission she was well oriented, had good memory, but diverted a good deal in conversation. Emotionally she

was lively but laughed without purpose. She had an uncontrollable impulse to climb trees or to run away suddenly from place to place without any purpose. Once she was noticed smearing the floor with urine. Her impulsive, erratic conduct would last for an hour or two at a time and in the intervals she would behave quite rationally. At the end of three months she was free from all these conduct disorders and was discharged from the hospital. She is reported to be doing well.

In contrast with the above case there is another which showed a marked regression with erotic manifestations of the worst type and in whom the insanity commenced two years prior to admission.

Case 4.—Female, aet. 30, a widow, was admitted on 10-3-1925. Physically she is thin and emaciated and is said to have disappeared from her house and was found on the top of a tree some days later. In behaviour and speech she is very obscene and destructive, and has an impulse to bite or scratch any one near by and is very fond of climbing trees. Emotionally she is elated but gets irritated on slight provocation. Eats voraciously and sleeps well, but in her waking state she is unreliable and dangerous. Before admission she attempted to drown herself and in the hospital she once tried to strangle herself with a strip torn from her clothing. She would occasionally be in a pleasant and rational mood but would suddenly revert to her vulgarities and morbid impulses. Up to date she is in the same mental state and in spite of careful dieting she has not improved physically.

Emotional dis-equilibrium which characterises the schizophrenic, may drive the patient to suicide as in the above case, or even to a brutal form of murder. An instance of the latter type was seen among the admissions in this hospital during 1925. The patient was in this asylum in 1924 and was discharged by the official visitors as he appeared to be free from insanity and normal in behaviour.

Case 5.—M. B., male, aet. 38, a landholder of good means, previously in this hospital from 11-3-24 to 5-12-24. He was reported to have left his wife and children and wandered from town to town, often in a mendicant's garb until he returned home after some years and began to molest people in his house and was therefore sent to the asylum. He was then in a depressed mood, quite mute and responding only by signs. But he gradually became responsive, cheerful and developed a proper outlook on life. He was therefore discharged in December 1924 and was adapting himself satisfactorily until March 1925, when one night, he says, he thought that he should exterminate his family and himself. The next morning, without the least provocation he seized his daughter aged 11 years and "cut her throat, then held her down and wanted to complete the act, and closed the girl's mouth to prevent her from crying." He gives an accurate description of the crime and bemoans his act. He was re-admitted into the asylum as a criminal lunatic and has been placid in mood and rational in conversation. Occasionally he gets irritated but has not up to now shown any tendency to violence.

Including this case, there were seven admissions of criminal lunatics. Of these one was charged with theft and six with murder. Criminal lunatics as a class are usually docile after admission into hospital and though rightly detained in the asylum on account of their crime being associated with insanity, they rarely display any marked tendency to violence. The explanation for this change

of behaviour probably is that "the psychic energy associated with a repressed complex having spent itself on the commission of the crime, the mind returns to the normal state." In another case where a woman, having killed her only child and attempted to cut her throat, had complete amnesia for two months subsequent to the crime. On recovery, she was tried for murder and acquitted on grounds of insanity. The occurrence of a state of blurred or obscure consciousness, allied to an epileptic state but without any history of convulsive seizures prior to or subsequent to the crime, is referred to in a recently published book on crime and insanity by Sullivan. The recognition of such a state is of practical importance from a forensic standpoint, and it may tax the resources of a medical witness to attest whether the alleged amnesia of a criminal act is genuine or simulated.

Including the cases carried over from the previous year, the total number of cases treated in this hospital was 267, of whom 61 were discharged cured. The term "cured" is capable of very elastic application. Generally it is applied to cases where a person having come with certain symptoms of disease is free from those symptoms on leaving the hospital, no regard being paid to the probability of a recurrence of the symptoms. "Cured" may be a misleading term in psychiatry and in the use of this term the psychiatrist undertakes a grave responsibility. With psychoses there is no such thing as an immunity conferred by a previous attack. On the other hand periodicity is a marked characteristic in the manic-depressive types and remissions are a well-known feature of general paralysis.

If environmental factors predominate in the causation of a mental trouble, the discharge of a patient from the hospital because he is cured and his return to the original environment may lead him as it were from the frying-pan into the fire and may rekindle the disease perhaps with greater intensity. The idea of having cured a disease is very fascinating and in many cases gives a false sense of security and tempts one to suspend further treatment.

Dr. Farquhar Buzzard in his recent Lettsonian lectures puts this matter tersely when he says "as physicians we should never claim to cure disease." This is no less true in mental than in any other kind of disease. In no domain of medicine is the necessity of following up the cases after discharge from hospital felt more than in the psychiatric field. In this respect the practitioner of general medicine with a working knowledge of the different types of mental disease with characteristics of each type as regards periodicity, remissions, and special forms of

conduct in relation to impulsive acts or dream states, could render incalculable service both to the individual affected and to the community. Greater interest in psychiatric problems will establish co-operation between medical men in general and those in charge of mental hospitals and tend to better attention being paid, not only to those who have

- (2) The extent of the "carrier" factor. A brief reference will now be made to those diseases which it has long been customary to isolate. In Table I remarks are made in connection with the two questions raised, and the value of isolation is indicated.

TABLE I.

Disease.	Question 1.	Question 2.	Value of Isolation.
Cerebro-spinal fever.	Yes.	Carriers very difficult to eliminate.	Small.
Cholera.	No.	Carriers infected for 2 3 weeks.	Large.
Diphtheria.	Yes.	Healthy carriers common.	Small.
Dysentery, amœbic.	Yes.	Ambulant cases common.	Small.
Do. bacillary.	No.	Direct contagion common.	Large.
Influenza.	No.	Direct contagion usual.	Large.
Leprosy.	Yes.	Ulcerating types infectious.	Large.
Measles.	Yes.	Contagion greatest in pre-eruptive stage.	Small.
Plague.	Yes.	Very contagious.	Large.
Scarlet fever.	No.	Very contagious.	Large.
Smallpox.	Yes.	Very contagious.	Large.
Tuberculosis.	Yes.	Ambulant cases usual.	Small.
Typhoid.	Yes.	Carriers very difficult to eliminate.	Small.
Typhus.	No.	Very contagious.	Large.
Venereal Disease.	Yes.	Infection difficult to eradicate.	Small.
Yellow fever.	No.	Carriers unknown.	Large.
Malaria.	No.	Complete cure usual.	Large.

once been victims of mental disease, but also to those who are in the border-land and who need all the help they can get to prevent a complete breakdown.

THE TREATMENT OF MALARIA: A PLEA FOR ISOLATION:

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A FEW years ago I had the good fortune to see the initiation of the treatment of general paralysis of the insane by malarial infection, in a large London asylum. Although every factor was inimical to the spread of the disease to non-infected patients, the most elaborate precautions were taken to isolate those under treatment. Such, however, is not the case in this country. Isolation wards form a feature of almost all Indian hospitals. They are used for dysentery and cholera cases, and perhaps for verminous or other undesirable subjects. However, with care in the disposal of excreta, and reasonable cleanliness, a patient suffering from any of these conditions could be safely nursed in a general ward, without any undue risk of infecting other patients.

The value of isolation depends on two questions:—

- (1) Whether the disease is communicable before it can be recognised and isolated.

Now the value of isolation is greater in malaria than in the case of any of the other diseases mentioned, as will appear on considering some factors in its etiology.

- (1) The source of infection is a patient with gametocytes in his blood.

- (2) Gametocytes do not develop until a week after the fever commences.

- (3) Diagnosis is easy and positive.

- (4) Infection can only be transmitted by the anopheline mosquito.

- (5) By isolating the patient it is impossible for the mosquito to reach him.

- (6) In a relatively short time, a patient can usually be completely cured of malaria, without the possibility of return, apart from reinfection.

- (7) The cure can be confirmed by the microscope.

This must be contrasted with the usual happenings in ninety-nine out of every hundred hospitals in India. The patients all have lowered resistance, they are congregated rather closely, and a constant stream of infection is hourly passing from those infected with malaria parasites to those not infected. Worse than this, mixed infections are occurring, a benign on a malignant, and both together on a convalescent pneumonia case perhaps. Worse again, a constant stream of infection, more intense and certain than any other mode of infection, is hourly passing

through windows and doors to the residential district around the hospital.

It may be objected that malarial infection is so broadcast that isolation measures in hospital can play only a small part in prevention. As far as the outside population of a large town is concerned this may be admitted, but still the other hospital patients would be safeguarded just when they are most susceptible to infection. In the case of industrial colonies, however, such as tea gardens and mines this objection does not arise. Here the two sources of infection are the acute cases in the wards, and chronic cases, mostly children, in the lines. It has frequently been stressed that these children should be systematically treated in order to sterilize their blood from parasites, but the importance of isolating the acute cases in the wards has not been emphasised enough, at any rate in India. Patients with malarial fever usually come to hospital quite readily, and there would be no difficulty in isolating them.

Practically all hospitals in tropical America employ screening as a matter of course. Watson(1) in his book on the prevention of malaria in the Malay States, devotes a chapter to screening, and gives interesting figures of its efficacy in hospitals. These are reproduced in Table II.

but this again is not satisfactory, as the mosquitoes gain access to the wards with the constant opening and shutting of doors, and once imprisoned in the hospital do more harm than if they had free ingress and egress.

The only satisfactory method is to entirely screen a given block, leaving only one entrance. The screening is best fitted to the outside of the verandahs, leaving doors and windows free. The single entrance must be efficiently trapped. This is best effected by double doors with an antechamber between. The doors must be provided with springs so as to be self-closing, and suitable punishment must be meted out to the "save-time" gentleman who props them open. Having entered the first door, a short passage is crossed before reaching the second door. It is very unlikely that any mosquitoes will then be able to penetrate the ward. The doors in each case should open outwards, so that mosquitoes resting on them should not pass into the room.

Objection is often made that such mosquito-proof rooms are unbearably hot. This does not arise if electric punkahs are available, but even without them ventilation can very easily be increased so as to overcome the stuffiness. Archemidian ventilators help in this way, and many other similar devices.

TABLE II.

Showing the number of Beriberi patients attacked by Malaria at Jeram.

Condition of hospital.	Mosquito nets only.	Ward mosquito-proof by screening.	Nets only.	Malaria cases not admitted.
Number of months	26	11	15	12
Number of patients attacked ..	75	5	48	20
Average number attacked per mensem	2.87	0.45	3.20	1.66

The great diminution with screening, and the rapid rise after removal of the screening show what a valuable part it plays. Yet I do not know of a single tea garden hospital in Assam which has adopted this course. Strickland(2) advises mosquito-proof bungalows and clubs, but does not include mosquito-proof hospitals, in his recent valuable paper on "The Mosquito Factor in the Malaria of Assam Tea Gardens."

Methods of screening.—At one hospital under my care individual mosquito nets were tried. These proved an entire failure as far as Indian patients are concerned.

They nearly always contained one or two mosquitoes when they were raised the next morning, and these mosquitoes were all the more intensely infected.

Efforts have been made to fix wire screening to the windows and doors of each ward,

Another objection is the "cribbed, cabined, and confined" feeling experienced in such rooms. This was more obvious in the older types of screening, but it is now possible to get finer wire which scarcely obstructs the view at all.

Cost.—Three types of wire screening are available: painted, galvanised, and almost pure copper. Undoubtedly the latter is cheapest in the long run as it is almost everlasting. To give an idea of the cost, a recent quotation for screening 48 inches wide, per 1,000 ft. was as follows:—

Painted.	Galvanised.	Copper.
Rs. 300.	Rs. 400.	Rs. 1,000.

A fairly large hospital can be completely equipped with this amount of screening. In a malarious district the whole hospital should be screened and not only the malaria wards.

Finally, it must be admitted that the extermination of anopheline mosquitoes in tea garden districts offers an almost insuperable difficulty. It can only be done after many years of constant work on a progressive programme. It involves large sums of money, and altogether it is an unattractive business to directors and shareholders. On the other hand, elimination of gametocyte carriers is relatively easy and less expensive. In the case of children, this should be done by ascertaining spleen and parasite rates, and subsequent treatment. In the case of infection derived from acute malaria patients, it is contended that the importance of isolation has not received the attention which is its due, and that screening is the ideal way of prevention.

SUMMARY.

- (1) The value of isolation generally.
- (2) The value of isolation in malaria.
- (3) Practical considerations.
- (4) Methods of screening.
- (5) Cost.
- (6) Conclusion.

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- (1) Watson. *The Prevention of Malaria in the Federated Malay States*, Murray, 1921.
- (2) Strickland. *Indian Med. Gaz.*, Vol. LX, No. 11, 1925.

EFFECTS OF BEE VENOM.

By A. R. D'ABREU, F.Z.S., I.M.D.,
Assistant to the Civil Surgeon, Lahore.

It is very rarely that cases of multiple bee stings are met with, though medical text books occasionally allude to deaths in human beings from this cause, without giving details of symptoms, and the main object of this paper is to report two such cases which survived, as also the results of single stings in certain patients who have come under my care, and some simple experiments with the venom of these stinging Hymenoptera on rabbits.

The action of snake venom has been the subject of a considerable amount of research from time to time, but little attention has been given to the study in India of insect poisons as affecting man. The local effect of the venom of bees and wasps is well-known and the constitutional effects apparently vary, at any rate in human beings. Judging from the literature available, the action of the toxins of bee venom is considered to be neurotoxic, i.e., causing paralysis, and the red cells are said to be destroyed by it by a process of hæmolysis and there may also be a

decalcification of the blood. The paralysing effect has been observed chiefly in other insects and the smaller animals but not in man. The virus is probably not sufficient in amount for this action to occur in man and in those rare instances where a sufficient amount may have been injected, as when a swarm of infuriated bees have attacked an individual, the death has been reported as from shock, insufficient time having elapsed for the observation of symptoms of paralysis. Judging from the two cases of multiple stings which have recently come within my experience motor paralysis at any rate was not seen, and the numbness felt in the swellings of the second case were the only symptoms of a sensory paralysis.

It seems to me from experiments on rabbits that the power of the virus is diminished when wild bees are placed in captivity in glass jars before being made use of experimentally. In the early part of their captivity they become very infuriated and restless and use their stinging apparatus indiscriminately against anything soft which they meet, such as a part of the comb itself or against each other. (They were usually careful not to strike at anything hard.) Once the initial restlessness wears off they quieten down, but directly they are interfered with again the same restiveness is repeated with probably a further weakening of the venom. Hence when honey bees are taken for experiment they should be made use of without delay. The three common Indian varieties, namely *Apis dorsata*, Fabr., *Apis indica*, Fabr., and *Apis florea*, Fabr., all die in jars on or about the third day after being taken, owing among other things chiefly to lack of fluid. The last two species are not half as fierce and energetic as the first. As their time in captivity goes on they naturally weaken and become sluggish, and the sting is hardly used even when they are picked up with a pair of forceps and irritated.

When stung on any loose tissue I personally suffer from a smart local reaction with moderate puffy swelling, and one day through carelessness a few of my third day stocks of *Apis dorsata* flew out and one alighted on my hand and another on my cheek, and each delivered a well earned sting. I felt rather alarmed at first, but to my surprise the reaction was of the very mildest type I have yet had, and was in all probability due to the effect on the bees of the duration of their captivity, this having had its deteriorating and weakening result on the venom.

Apis dorsata and *indica* only were used in my experiments. The insects were killed with a few drops of chloroform and the sting and poison glands dissected out and washed in weak phenol solution, and an emulsion made of them in distilled water which was

finally filtered to remove any chitinous material. The site chosen for the injections was the thicker root portion of the ears of rabbits. The ears show up all local reactions very vividly. The virus of *Apis dorsata* is somewhat stronger than that of *Apis indica* judging from the use of the venom from an equal number of either species. The action of both amounts to a local inflammation of the whole ear with marked hyperæmia and reddening at the site of injection. The animals move about and do not appear constitutionally affected, except for an increased rapidity of the heart and respiration probably due to fright. The ear becomes warm compared to the opposite one and the vessels engorged.

In about 2 to 4 hours the inflammatory reaction passes off, leaving only the dark area at the actual point of injection and this in the course of 4 or 5 days either scabs directly, or at first becomes slightly pustular and then scabs. These effects are noticed when the poison from 20 to 100 bees is used. When the dosage is increased to that from 150 to 200 bees the local reaction is somewhat severe and the next day the animal appears somewhat anæmic and thin and with a staring coat and though slightly off its feed nevertheless continues feeding. The slight pallor and debility lasts 3 to 5 days and gradually wears off. The site of injection after three days becomes purulent and then later dries and scabs. In all cases the ear used droops, probably from pain. Allowing one to six fairly lively bees to sting the ears only causes local inflammatory symptoms, with no after-pustule and all the signs wear off inside two to four hours, except at the site of puncture where a little speck of redness remains for two or three days. There are no constitutional symptoms observable and the animals move about as usual and seem hardly affected. I may add here that it takes quite a long time to get a bee to use its sting after it has been in captivity, but once protruded, it is inserted with such power that on removing the insect, the sting is sometimes left behind in the tissues of the rabbit's ear. The reason for not using the sting may be that the stinging apparatus has already been injured owing to careless use against hard substances during the ire and excitement immediately after capture. Within an hour after the above experiments, and also three or four days later, the ears seemed sensitive to tactile and pricking sensations and these elicited flinching. The anæmia, I am inclined to think, was probably due to the local pain and consequent suffering which the animals were put to, with the added fright and shock from the injections and handling. The rabbits used were young animals and weighed approximately 680 grammes each (1½ lbs.).

From these rough experiments on rabbits, it will be seen that no paralysis was observed, nor were there any signs of hæmolytic or urticarial rashes or local or general serous effusions.

I will now describe the two cases of multiple bee stings, as also some others in which there was only a single sting. The first case will be of more interest to readers as the symptoms were unusual.

Case 1.—In the third week of February this year Mrs. R. while walking bareheaded under a tree in her garden disturbed a squirrel, which in its hurry to escape, apparently alighted against a bees' hive and thereby broke parts of the comb away, which fell on the lady's head below. The scalp was severely stung as also the forehead, but the face and neck escaped lightly. The hands and forearms in brushing away the bees were also stung. No excessive stinging or burning pain followed except an unbearable headache, and no swelling was observed even in the loose tissues of the face, neck, forearms and hands, but in about half an hour's time the patient was prostrated with very acute watery vomiting and diarrhœa. Her face became blanched and pinched, eyes sunken and extremities cold, and there were all the appearances of general collapse resembling those of a case of cholera. The face and surface of the body appeared extremely blanched, suggesting marked splanchnic dilatation. There was regular colicky pain in the abdomen described by the patient as cramps before each motion was passed, and the frequent retching led to extreme depression. The mouth became dry and thirst acute as the loss of fluid from vomiting and diarrhœa progressed, and the patient was afraid to quench the latter, as it seemed to aggravate the vomiting, each act of which left her more collapsed. The pulse reached 130 per minute and was weak, and steadily lost volume but was not thready. The vomiting at first was bilious and then became quite watery with only the slightest tendency to opaqueness. Directly the fecal contents of the bowels had drained away, the character of the motions was watery with a very light brownish opaqueness. By the fifth to sixth hour the patient commenced to recover and all the symptoms seemed to abate more or less abruptly. Pain from the stings on the head was still complained of in the evening, but up to then the bites had not caused any noticeable swelling except for very tiny hardish lumps. By the third or fourth day these lumps grew bigger, reaching the size of a large split pea, and remained hard and then gradually disappeared by the tenth to twelfth day. The stings on the face, neck, forearms and hands caused no swelling and the very faintest sign of redness at a few points, which was more probably due to the parts being rubbed by the patient. No part of the body showed the usual puffy swellings or urticarial wheals commonly seen after bee or wasp stings, and the ordinary acute stinging or burning sensation was not complained of, and there were no respiratory symptoms. Urine was voided but was scanty. I regret that the stools were not examined for cholera vibrios, as I felt justified in excluding the possibility of this disease, on the ground that though the onset was sudden—very shortly after the stinging—there were no recent cases in the town or in the vicinity of the patient's house, and I was satisfied that she had been very careful with her water and milk supply and I was also able to eliminate any possibility of carriers among her relations, friends, and servants. The cause of these choleraic symptoms after bee stings seems obscure and the only explanation which I venture to suggest is that there was some change in the patient's system, due to septic infection during childbirth, from which the patient had very recently recovered. The offending bees in this case were *Apis dorsata*, Fabr., the large Indian bee, and the patient had had individual stings before with only a local effect.

Case 2.—In the second case, which occurred last year in the month of April, Mrs. H. was doing a steep climb in the Kumaon Hills on her way to Loha Ghat (Almora district). She alighted from her pony at about 9 a.m. and told the pony-man to wait a little distance up the hill for her. The pony was browsing and as she came on more leisurely up the road, she suddenly noticed the animal rear and bolt up the hill with the pony-man after him. Having no idea as to what had happened, she walked on and into a swarm of bees, which had undoubtedly been disturbed by the pony. They attacked her mercilessly and stung her on the shoulders, arms, head and neck. Her face was partly protected by her hair in the struggle which ensued. She killed bunches of bees in her hands before help came in the form of a coolie, who threw her a *durrie*, and told her to cover herself up along with the bees, which were most tenacious and would not leave her. She was exhausted with the struggle and lay for quite fifteen minutes or more on the road under the *durrie*, whilst the coolie, enveloped in a blanket, made a fire of dry leaves to smoke out the bees and led her to it. Three such fires were lighted at further stages up the road, but still the bees hovered about, ready to return to the attack. At this stage she suffered from a most intense thirst, which she could not quench even after a large quantity of water had been taken. A little later, when the venom had had time to produce its local effects, the patient did not complain of pain, though hard lumps appeared on her head, neck, shoulders and arms, and she felt, to use her own words, "weighted with an acute numbness." At least fifty stings were extracted with the fingers and thumb and others which could not be got out were left behind. This all happened at about 10 a.m., and with the fright and shock and accompanying exhaustion she fell asleep and did not wake till 2 p.m. She thinks she may have been slightly unconscious or light headed during this period. She now with a great effort walked slowly on, though her head and limbs felt exceedingly heavy, and by 5 p.m., when a halt was called, she felt fever coming on. By 10 p.m. her head and shoulders felt very weighty and painful and she developed high fever followed by profuse perspiration. She was restless and semi-delirious all night. The next morning she woke, and except for the hard swellings she felt refreshed and energetic and was able to continue her journey. There was no further pain or ill effects, but the hard lumps took three to five weeks to disappear. These swellings, when touched, did not actually pain except when pressed, but to use Mrs. H.'s own words again, "felt frozen, hard and numb." Mrs. H. says that a very curious thing was that she crushed handfuls of the creatures in her hair and never seemed to feel the stings in the palms of her hands. She was in good health before the attack and except for a numb feeling over all the areas stung for two days after her misfortune, no other symptoms developed. The digestive system was not impaired. She had not been stung by bees before but the result of wasp sting on her finger was a very mild local irritation, and she has never had urticaria. In this case it seems evident that a very heavy dose of venom was introduced, yet no particular constitutional effects resulted, nor was there any evidence of destructive changes in the blood, but there was a paralysis of the sensory terminations locally. The fever was probably due to the intense local inflammatory reactions.

I will now quote a few of single stings which have come within my experience.

Case 3.—I remember the case of a well-known medical officer, in whom marked urticaria with great swelling and serious respiratory symptoms followed from a single sting which had entered a superficial vein in the foot: here direct admission of the poison into the blood stream accounted for these severe symptoms. He had apparently been stung before in his life with only a local reaction at site of injection.

Case 4.—There are two patients living in Lahore at the present time who suffer from regular attacks of urticaria. The one, Miss H., gets an attack almost

every fourth or fifth month and the attacks occur especially during the cooler months of the year and are brought on by various foods, such as fresh fish and prawns, tinned fish and most other tinned meat foods. She has suffered for many years. The smallest dose of quinine precipitates an attack in this patient and bee and wasp stings produce very severe urticarial eruptions on her.

Case 5.—The second case, Mr. N. has an attack of urticaria at least once a year regularly, the cause of which has not been traceable so far, but in his case a bee or wasp sting only produces local swelling and pain. I may add that Mr. N. recovers rapidly under calcium treatment, but Miss H. is a very intractable case and reacts to nothing, including adrenalin and pituitrin, though there used to be a time when they helped her.

I do not think that any two people suffer alike from the stings of bees or wasps, nor does the same individual always display similar symptoms on successive occasions. This may be due to variations in the amount of venom injected by these stinging Hymenoptera, or to a variation in the nature and quality of the poison, or the results may depend on the portion of the body stung, i.e., a vascular area or otherwise, or to the venom entering a blood vessel, and also to the condition or phase in which the body fluids of the person attacked happen to be in at the time. The venom also probably varies in the different species of these insects, and also with the season of the year, as it is a known fact, of which I have personal experience, that the local results are quite mild from a sting from a bee or wasp in the winter, whereas in the summer the effects are greatly intensified. The results must also vary according to the deliberateness with which the sting is introduced and also with the amount of poison available or remaining for effective use.

The result of the labours on this subject of A. S. Packard and other entomologists quoted by him, are of interest, and show that the two glandular parts of the poison apparatus of most Aculeata secrete an acid and an alkaline poisonous material respectively, and these would appear only to have a certain maximum and definite action when suitably mixed in the poison sac before delivery through the sting. This, I assume, especially occurs in nature, when these insects have their freedom and are in full vigour. The combined venom is always acid in reaction. When used on rabbits, frogs and beetles, the action was found to be slight, but domestic flies were immediately killed by it. The secretions of the acid or alkaline glands used separately have a very mild and slow action when inoculated experimentally into flies. Death is produced by the secretion of the one gland after some very considerable time; but when the same fly is subjected to a second inoculation from the secretion of the other complementary gland, death soon follows. The varied results observed from stings almost lead one to suppose that even in Nature

there may be frequent errors in the proportions forming the combined venom which is finally ejaculated, so that, experimentally, it would seem well nigh impossible to reach anything resembling the ideal fluid.

Will states that the poison in bees and wasps consists of two substances, viz., formic acid and a whitish, fatty, sharp, bitter residue in the secretion of the glands; formic acid is the essential part of the poison.

The experience of many observers points more or less definitely to the acquirement of an immunity in some persons against the stings of bees. Apiarists in India seem to think that a considerable degree of immunity is conferred against the venom by the continuous handling of bees. When apiculture is first started the stings cause their usual smart reaction, but as time goes on the only result or sensation when stung is that of a mild prick. The non-apiarist Indian honey collector is another example probably of acquired immunity. These men handle bees with impunity and do not seem to come to any harm when stung. They say that the sting has no effect on them except if left behind. Their method consists in the use of a bunch of tightly tied leaves of some plant or tree, in the centre of which is placed some slowly combustible material, which is set alight from an opening and blown into, and directly the core smoulders sufficiently it causes an incomplete combustion of the surrounding green leaves, which give off large volumes of strongly smelling smoke. This smoke is allowed to play over the clothes and body for some seconds and is then moved about the hive. The bees now partly fly off the comb or crawl to the upper parts, when the required honey-filled area is sliced off with a sharp curved knife. These men have not the slightest fear of being attacked by bees in their efforts to secure honey, and seem quite indifferent to stings, often climbing very high trees in search of honey. They are known to steal the honey from guarded hives at night. They will not give away their secret but state that the smoke produced has a stupefying effect on the bees. I am told that they also smear the exposed parts of their bodies with something which repels bees, but the alleged substance is not visible on their skins as far as my scrutiny has gone.

Horne (*Trans. Zool. Soc.*, Vol. VII) gives some very interesting studies on bees and wasps, with observations on the action of their venom. One experience of his with the large Indian bee (*Apis dorsata*, Fabr.) may be quoted as a classical example of immunity against the stings. "On another occasion my camp was pitched at Soj, October 19, 1866, under a large peepul tree. In the camp was my riding elephant, which animal is very fond of the leaves and small boughs of

this tree. To enable him to enjoy them he was fastened under the tree, which he shook considerably in his endeavour to break off branches; this disturbed a nest of bees who had an enormous comb high on one of the branches. At first three or four bees came down to see; they flew back, and brought down some fifty or sixty with them: these did not attack the elephant, but stung almost everyone in camp, cattle grazing near, and even a stray dog, which I think they killed. The strangest thing was that a man lying quite unprotected and fast asleep (named Cheda), clad with only a waistcloth, was quite unmolested; and I have often employed him to take the nests of aculeate Hymenoptera for me, as they do not harm him, whatever he does. How is this accounted for? The natives say that he smells offensively to insects. It is hardly possible that this man was never stung in taking the nests, so that besides being immune to attack, he is also a case of complete immunity against the venom."

Horne quotes the death of two horses from the venom of *Apis dorsata*, as follows:—"A curious accident occurred at this place on Sunday last. A number of bees had built upon a cornice round the tower of St. Paul's, in the Civil Lines, just below the steeple. On Sunday, after the morning service, the bees, disturbed either by a pellet or stone thrown into their midst, or from some other cause, suddenly attacked a pair of horses in a carriage and stung them so severely that both the animals died the next day. The coachman also was severely stung. It was considered unsafe to hold divine service again that day, Agra, April 14, 1867."

Though not bearing on the present subject, I may mention that this authority quotes the results of wasp stings on himself, which varied in intensity and duration according to the class of insects which attacked him. He also records instances of death from the venom of various species of wasps in animals and even in men and children; and in the last instance of four or five stings having been sufficiently powerful to kill. He also gives an instance where a full-grown sheep belonging to a resident of Ranikhet, near Almora, was killed by wasps of the species, *Vespa flaviceps*, Smith, the animal having trodden on the entrance to a nest or pulled up some plant in feeding, and so disturbed them. It is a well-known fact that certain wasps seize spiders and store them away in their cells for the young grub to live on. These spiders are rendered harmless to the grub by being stung and thereby paralysed and live for a considerable time and serve as fresh food. From the above records it seems possible for wasp venom to have a lethal effect on man and large animals.

In conclusion, I have to thank Dr. Syed Walayat Shah of the Police Hospital, Lahore,

and head dispenser Baij Nath of the Civil Dispensary, Lahore, for the trouble and risk taken in obtaining supplies of the different varieties of bees.

A Mirror of Hospital Practice.

THE TREATMENT OF BURNS AND SCALDS BY STERILIZED COCOANUT OIL.

By N. GOPALAN, L.M.P.,

Sub-Assistant Surgeon, Local Fund Dispensary, Tiruvetipuram, North Arcot District.

BURNS and scalds are very common accidents in this country. The successful treatment of burns depends upon a number of factors, viz., the age and strength of the patient, the extent of the surface affected, the degree or the severity of the burns, the situation of the burn and the amount of shock received by the patient during the course of the accident.

The treatment of burns and scalds must first be constitutional and then local and not the reverse, because the patient's life is in danger, while there is no immediate necessity for dressings as the burnt surface itself is a protection against septic infection on account of the germs of the skin having been destroyed. The general treatment consists in combating the shock by the administration of opium or morphia in adults suffering from severe pain, and by brandy, injections of camphor, and rectal injections of warm saline and glucose solution in weak individuals and children. The local treatment should commence only after the shock passes off.

Usually the local treatment consists in washing the affected parts with boric lotion (10 gr. to 5i) or permanganate of potash lotion ($\frac{1}{4}$ gr. to 5i) and then dressing with gauze or lint soaked in picric acid solution. Carron oil application, eucalyptus ointment spread on lint, or dressing with boric or zinc ointment are also recommended. The first is very costly and is not supplied to most of the out-of-the-way dispensaries. The second, i.e., carron oil, is a dirty oil, frequently leading to sepsis. Treatment by eucalyptus or boric ointment is also not quite satisfactory. Our object should be to find a remedy which should be cheap, easily available and at the same time efficacious.

In my experience as a medical man for the last 13 years, I have had several opportunities of treating cases of burns and scalds of varying degrees of severity with sterilized coconut oil dressings and I had no occasion to regret the results. The method adopted by me is as follows:—

Take a covered decoction pot with a pint or two of coconut oil and soak in it long strips of gauze or lint sufficient to dress the case, and boil the same for not less than half an hour. Let it then be allowed to cool. With sterilised hands dress the injured surface with the gauze or lint wrung out of the sterilized coconut oil.

The wound heals rapidly. The advantages of this method of treatment are:—

1. Coconut oil is easily and readily available in this part of India.
2. It is very cheap.
3. It is soothing and non-irritating.
4. It does not adhere to the wound when the dressings are removed.
5. It is very efficacious.

I would earnestly appeal to my brethren in India to try this method of treatment and report the results through this *Gazette*.

THE USE OF SODIUM SALICYLATE BY INTRAVENOUS AND INTRAMUSCULAR ADMINISTRATION.

By SURESH CHANDRA ROY, L.M.S.,

Assistant Surgeon, Jorhat, Assam.

SODIUM salicylate has been extensively used since the discovery that it was an analgesic drug of value in rheumatic and similar affections. But it is almost entirely given by oral administration, and sometimes its use, even in large doses and over prolonged periods, is attended with disappointing results.

I have used this drug by the intravenous and intramuscular routes for the past twelve years, and have found that this method of administration is far and away superior to administration by the oral route. Further, by such methods of administration the irritable effect which the drug produces on the stomach is avoided. In my experience, on local injection into inflamed and painful joints, etc., it causes local softening, and results in freer and less painful movements of the joints. I have used it in cases of fibrous ankylosis of joints, myalgias, general and localised neuritis, whether severe or chronic; whilst the contra-indications to its intravenous or intramuscular use are almost nil, provided that suitable dosage is not exceeded.

By intramuscular injection I have used this drug in fibrous ankylosis of all the major joints, in intercostal and supraorbital neuralgias, in sciatica, chronic joint affections, myalgias, and in the intractable chronic nerve pains of leprosy. Intravenously I have used the drug in cases of obstinate headaches of uncertain origin, in headache due to glaucoma, in chronic intractable pain in joints and bones due to syphilis, and also in the general nerve pains in leprosy. The dosage should be regulated by the severity of the symptoms. For intramuscular injection an injection of 10 grains of Merck's sodium salicylate dissolved in 2 c.c. of normal saline gives good results. A dose of less than 10 grains by this route, in my experience, does not give good results, whilst a greater concentration leads to local burning and tingling sensations. For intravenous use 5 grains of the salt are dissolved in 4 c.c. of normal saline and injected. The injections, whether intramuscular or intravenous,

may be repeated every 4th or 5th day until full relief is obtained.

Except for causing temporary buzzing in the ears, a slight increase in the depth of respiration, a sense of giddiness, a transient slowing of the heart beat, and symptoms of warmth all over the body, such intravenous and intramuscular injections of sodium salicylate give rise to no toxic symptoms. I prefer to repeat the 10-grain intramuscular dose or 5-grain intravenous dose, rather than to increase the dosage.

In the treatment of leprosy I have found such injections to be particularly useful. In cases with thickening of the nerves, with intense chronic biting and gnawing pain in the joints, and with a general sensation of numbness and heaviness in the affected limbs, immediate relief follows. Patients who have been suffering from these symptoms experience immediate relief after a single intravenous injection for a week or a fortnight on end. The psychological effect of such injections is also marked and patients take a more cheerful view of life. Through the courtesy of Dr. E. Muir, M.D., F.R.C.S. (Edin.), Leprosy Research Worker, Calcutta School of Tropical Medicine, a systematic trial of these injections is now being tried in cases of leprosy with nerve and joint pains.

The following are illustrative cases of this method of treatment:—

Case 1.—Minaram Katoni, Hindu male cultivator, aged 45 years had an acute attack of rheumatism involving both knees about 6 or 7 years ago. This resulted in a condition of fibrous ankylosis of both knees in an acutely flexed position. Being permanently invalided he became dependent on his wife's earnings. As his wife also fell ill and could not support him he was brought to hospital. After he had been in hospital for a week I tried to extend his joints under general anaesthesia but failed. I then started giving injections of pure sodium salicylate, 10 grains dissolved in 2 c.c. of normal saline. The injections were given twice a week into the thickened fibrous tissue of the joints at various joints where the tissues seemed to be toughest and unyielding. Massage and passive movement of the joint was practised as usual, along with the medication. The patient had a dull pain in the affected joints; this entirely disappeared within 4 hours of the injection. After 8 injections, i.e., within a period of 4 to 5 weeks, it was found that the joints were more flexible and the tissues were getting softer than before. Pain on attempts at forcible extension was almost nil. At the end of 8 weeks the patient could extend both knees almost to normal extent. He was then made to walk regularly with the help of a stick during the day, time as often as he could. About this time one of his friends came to hospital to enquire if the patient was dead or alive. To his surprise he found him walking in the hospital compound. He informed the patient's wife and others of the fact that Minaram who had been crippled for 7 years was now able to walk. The patient's wife and others came from the village to hospital to see him. He was finally discharged cured after 16 weeks and walked home.

Case 2.—A retired Mahomedan extra assistant commissioner, Hazi, aged 57 years, consulted me for acute biting and gnawing pain in his right shoulder joint of a year's duration which prevented complete extensions of the joint and its free use; in fact he had to keep his arm supported in a flexed position always.

Various remedies had been tried but with no appreciable improvement. There was a marked painful spot at the back of the joint which I located and gave intramuscular injection of pure sodium salicylate, gr. 10 in 2 c.c. of saline, right into the tissue of the painful spot. The patient at once complained of a burning tingling sensation down the whole of his affected arm as well as at the site of injection, but the pain passed off within half an hour and his old joint pain was very much better. There was some wasting of the deltoid due to disuse, and massage with anodyne liniment and passive movements were practised. Another injection of a similar dose was repeated next week, and the same pain was complained of immediately after injection, which passed off within 15 to 30 minutes, along with complete subsidence of his remaining original pain. The patient who could not even sign his name without supporting his elbow and who had passed many sleepless nights, felt perfectly fit within ten days of commencing the treatment. I met him two months later. He reported that he was well and could move his arm freely.

Case 3.—A Hindoo lady, aged about 50 years, consulted me for chronic pain all over her body, sometimes located in the joints, at other times in the muscles, which rendered her almost crippled for over 8 months. About a fortnight before I was called in, she had a severe attack of lumbago and she could not move from her bed. Various remedies were tried by various medical men, but with no appreciable relief. After giving her a dose of salts and examination of her urine I gave an intravenous injection of 5 grains of sodium salicylate in 4 c.c. of normal saline. She felt a slight sense of giddiness and ringing in the ears for a minute only immediately after the injection, but within 15 minutes to half an hour all her discomfort, including the original pain in the body entirely subsided. She remained perfectly well for a week, after which there was a tendency for the pain to reappear. Another intravenous injection of 5 grains of sodium salicylate in 4 c.c. of normal saline was given and the same dose was repeated once again a week later. Her original complaint never reappeared up to the six months during which I was able to follow up the case.

Case 4.—Ramia Kanoo, Hindu male, aged about 35 years, domestic servant was brought to me for recurrent attacks of acute pain down the back of his right thigh and leg of duration 3 years. On examination his sciatic nerve was found to be tender all along its course. The muscles at the back of the thigh and legs appeared to be somewhat wasted. I selected a tender spot in the course of the nerve at the back of the thigh just below the fold of the gluteus and infiltrated 10 grains of sodium salicylate dissolved in 2 c.c. of saline. Immediately intense burning sensation was felt down the whole leg, which however passed off quickly. An intravenous injection of 5 grains of the salt in 4 c.c. of normal saline was repeated 3 days later. After the second injection all pain disappeared, except for a dull heavy sensation in the part. He could then walk without discomfort. About 10 days later another 5 grains of the drug was given intravenously and the patient was sent away to his native village in Chapra district for a change to drier climate. He returned to duty six months later and when I met him he told me that his pain never recurred since the last injection.

Case 5.—A Hindoo male, aged 50 years, pleader by profession, suffering from neuralgia of the 5th nerve—duration about one year, consulted me for dental neuralgia. His pain used to increase during his professional practice and his living was at stake. I gave him 4 intravenous injections of sodium salicylate in 5-grain doses, repeated every 4th day, which speedily gave him the desired relief and his pain has never recurred since the last injection.

Case 6.—A Mahomedan male, aged 30 years, occupation basket weaving, sought my treatment for an intractable supraorbital neuralgia—duration 6 months. All sorts of remedies including administration of quinine in big doses had been tried. Aspirin or phenacetin in

massive doses, only produced temporary effect. Three intravenous injections of sodium salicylate in 5-grain doses, repeated every 4 days, removed all his pain. I advised the patient to report to me at once if the pain recurs but he never turned up.

Case 7.—Hindoo male, aged about 40 years, petty shop-keeper, syphilitic subject, complained of frequent general pain all over his body including muscles, bones and joints—duration 1 year. He came to consult me when still under specific antisyphilitic treatment. An intravenous injection of 5 grains of sodium salicylate in 4 c.c. of normal saline was given, and repeated thrice a week for 3 weeks, along with the specific treatment which was continued. This brought all his pains under control and the pain never recurred within a year and a half as far as I could ascertain.

Case 8.—Hindu girl, aged 16 years, suffered from intercostal neuralgia—duration 2 years. Two injections of sodium salicylate were given intramuscularly in 10-grain doses dissolved in 2 c.c. of normal saline at the site of the pain once a week, followed by two intravenous injections in 5-grain doses repeated twice a week. This stopped all pain. She was advised to see me again if the pain recurred but I have not heard from her as yet.

Cases 9, 10, 11.—Three lepers of Sylhet district, all of them of nodular variety were privately treated by me on different dates for nerve pains of leprosy by intravenous injection of pure sodium salicylate—5 grains dissolved in 4 c.c. of normal saline. Instant relief of pain was a marked feature in all these cases, and the effects were fairly lasting.

In conclusion I beg to offer my grateful thanks to Dr. E. Muir, Leprosy Research Worker, Calcutta School of Tropical Medicine, for kindly encouraging and suggesting to me to have the facts mentioned in this paper published.

A CHEAP AND WATERPROOF SUBSTITUTE FOR PLASTER-OF-PARIS IN OUTPOST DISPENSARIES.

By JEMADAR MATLOOK KHAN, I.M.D.,
Sub-Assistant Surgeon, In-charge, Barsar Dispensary,
Kangra District.

When plaster-of-Paris is not available locally, and to procure it through the post would be expensive, I have found that the following substitute is very useful.

Four chittaks of black gram (mash) are soaked in water for twelve hours, as in the germination of *dāl*. The grains are then rubbed between the palms of the hands in water so as to separate the black pericarp from the white seeds (as in the preparation of *dholi dāl*). When the white seeds have been completely separated, rub them thoroughly in a pestle and mortar into a fine paste (not too thick).

Soak the bandage in water for ten minutes and then squeeze the water out of it. Apply the paste to the surface of the bandage which is not going to be next to the skin. Commence to apply the bandage, but after every turn rub finely powdered cement (such as is used for ordinary building purposes) into the bandage so as completely to soak into its meshes. Continue this at every turn of the bandage. When bandaging is completed, over all the turns give another coating of the paste and a coating of cement. Allow to

dry, which takes about the same time as does plaster-of-Paris.

The dressing is waterproof, easily procurable in out-of-the-way places and dispensaries, cheap and efficient. Moreover, it does not require any special technique, as plaster-of-Paris does.

A CASE OF ENORMOUS OVARIAN CYST.

By GOPAL R. TAMBE, M.A., B.Sc., I.M. & S.,
Chief Medical Officer, Cutch.

THE photograph sent herewith shows a case of ovarian cyst admitted to the Jubilee Hospital, Bhuj, in the month of June 1926. The picture speaks for itself. Ovarian cysts, simple and complicated, uni- and multilocular, and of varying sizes are of common occurrence, and they are to be counted in numbers in the practice of almost every surgeon in charge of large hospitals in India. I myself have removed a good many successfully in Indore, Narsingpur, and latterly in Bhuj. In the three months preceding the admission of this patient we did three ovariectomies successfully for a similar complaint. The biggest tumour I removed previously weighed about 48 lbs. (I quote from memory). The patient was not able to lie on her side without being



toppled over. The case under report was still heavier. It is a pity the dimensions were not taken before operation, but it is a fact that she had to be supported by two assistants, one on either side of the operation table, to prevent her from falling. With a view to deliver the tumour through a small wound I made an incision about 6 inches long, exposed the wall of the tumour

and tapped it. We removed 56 lbs. of a ropy, glairy, coffee ground coloured fluid. As the tumour was reasonably reduced in size, I tried to separate the adhesions while the drainage continued. As the cyst was a multilocular one we had to tap each chamber separately. The adhesions proved too many and too firm, we had unfortunately to give up the attempt and content ourselves with only the drainage. We therefore closed the wound and kept up the drainage. In the course of these manipulations we must have lost no less than 8 to 10 lbs. of the fluid on the table and the ground around. This, plus the profuse quantity drained in the first two days after the operation, could not have weighed less than at least 80 lbs. in all.

Though the patient survived the first shock of the operation she gradually became exhausted and succumbed.

On examining the cyst it was found to be malignant.

The interest of the case lies in the extraordinary size of the tumour. I am not sure if a larger tumour is recorded in the literature.

I am greatly indebted to Dr. Miss Naoroji for assisting in the operation.

A CASE OF RUPTURE OF THE SPLEEN DURING AN ATTACK OF MALARIA.

By P. SAVAGE,

CAPTAIN, I.M.S.,

Resident Medical Officer, The Lawrence Royal Military School, Sanawar, Simla Hills.

SPONTANEOUS rupture of the enlarged spleen in malaria is sufficiently uncommon, and cases deserve record.

Manson-Bahr in his *Tropical Diseases* (1919) merely mentions it; Rogers (*Fever in the Tropics*) writes of three instances having been met with in 30,000 cases of malaria at Panama.

Byam and Archibald briefly describe a case in a European soldier in their *Treatise on Tropical Diseases*.

The following case came to my notice when I was Staff Surgeon, Kohat, and is published by the kind permission of the Director of Medical Services in India.

J. K., a British soldier, aged 33, was detained in hospital at 14.30 hours on the 6th January 1924, with a temperature of 103.6°F. He suddenly and rapidly expired on the 7th January at 15.40 hours.

Previous History.—His medical sheet gave the following information. He had had numerous admissions to hospital for malaria (benign tertian). His last admission was from 1st to 6th November 1923. At one time in the summer of 1923 his spleen was "plus plus." During 1923 he had frequently been admitted with mild relapses of malaria, accompanied by gastric pain, and attacks of dyspnoea with râles in the chest resembling asthma.

On admission the temperature was 103.6°F. and he was vomiting a good deal of bile-stained fluid.

The next morning the temperature had dropped to 99.8°F., the pulse was 82 and he stated that he felt better. He spent the morning in bed reading.

At 13.00 hours he became restless and complained of pain over the stomach and made several attempts at vomiting, without any result. Morphia $\frac{1}{4}$ gr. was injected hypodermically.

At 14.45 hours he looked very ill and the orderly assistant surgeon was summoned. He found the patient pale, complaining of severe gastric pain and a sense of dizziness, and leaning over the bed attempting to vomit.

At about 15.10 hours I was called. He was then reclining in bed looking desperately ill. The face was very pale, hands and chest cold and clammy and he was perspiring. The respirations were frequent and long-drawn. The pulse was 80 and weak, but not markedly hæmorrhagic in character.

The patient was conscious and understood my questions; he said he could not see me but knew me by my voice. I commenced to examine the heart, but was twice interrupted by his sitting up and fighting for breath, at the same time clawing his chest. A rapid examination revealed nothing, but the heart sounds were counted and confirmed the radial pulse. By this time the man was moribund. No abdominal tenderness could be elicited nor was any enlargement of the spleen or liver detected and in a few moments he died during examination.

I was in doubt whether the fatal syncope was due to an internal hæmorrhage, since there was no history of an injury, nor was there any bacteriological report to verify that the fever was malarial.

The case at the time resembled the fatal termination of angina pectoris. (The man looked much more than his age.) I obtained permission for an autopsy for the following day. The post-mortem findings are given here in full.

Post-mortem Examination.—The body was well nourished. Rigor mortis was still present. The usual normal patches of hypostatic congestion were present on the dependent areas of the body. No evidence of any external injuries.

Brain.—A general anæmic appearance. Patches of old meningitis on the anterior upper surface of the frontal lobes. A blood smear direct from a cerebral vein was examined for malaria parasites and young types were reported to be present in abundance. On section the brain was normal.

Thorax.—The chest was fixed in a position of deep expiration with the diaphragm on both sides compressing the lungs.

Lungs.—Compressed; otherwise normal.

Heart.—A little blood-stained fluid in the pericardial sac. The organ on removal was completely enveloped in fat and weighed 14 ozs. (396.9 grms.). The aorta showed early and slight atheromatous patches in places. Aortic valves were normal.

Left ventricle.—Small ante-mortem clot. Valves normal. Musculi papillaris hypertrophied. Ventricular wall considerably hypertrophied (twice as thick as the right ventricle). The whole ventricle was very pale.

Right ventricle.—Very pale. Valves normal. Walls not hypertrophied. The ventricle contained a large ante-mortem clot.

Pulmonary artery.—Contained an ante-mortem clot but not sufficient to cause death. The heart was fatty, hypertrophied, but not dilated and very pale owing to depletion of blood.

The coronary arteries were not examined.

The heart was not sufficiently diseased to account for death.

Abdominal Cavity.—On opening the abdomen about a pint of pure blood escaped. The intestines were distended and filled the whole abdominal cavity. Immediately there was noticed a large, formed, partly adherent blood clot, running down from the left epigastrium over the intestines into the pelvis.

This clot in its upper part was 3 inches broad and continuous with the parietal surface of the spleen and tapered below to about 1 inch, where it entered the pelvic cavity. The hand was carefully passed over this to the upper and posterior part of the spleen. This was found to be surrounded by blood clot and a rupture admitting one finger was felt.

With care but with great difficulty, the spleen was delivered and examined on the table.

Spleen.—Completely surrounded by blood clot on the anterior and upper surface.

Weight when cleaned 453.5 grms. (Normal spleen weighs 160 grms.)

The organ was enlarged, deeply congested, and of a violet colour. The capsule separated easily and on handling, the organ disintegrated at the slightest touch. The original rupture was therefore not demonstrable.

The examination was not proceeded with further as the cause of death—hæmorrhage from rupture of the spleen—was clearly evident.

In the light of this knowledge I made further enquiries into his recent movements prior to admission. I learnt that a few days before being brought to hospital, he had been attending hospital with negative signs—no definite diagnosis, but merely unwell.

The day of admission (6th) he had had a slight fainting fit in his barrack which necessitated him lying down on his bed for a short time.

He was vomiting when carried to hospital for admission but brought up nothing. His complexion was florid, as it always was.

The night orderly had reported he had passed a good night; slept well and taken nourishment and treatment. The day orderly (of 7th) stated he spent the morning in bed reading. He never sat up in bed, and the day previous when vomiting he had just leaned over the bed side. In the words of the nursing orderly on duty "he was just like the other patients."

REMARKS.

1. The syncopal attack on the day of admission, which necessitated him lying down, is significant.

2. Rupture had probably taken place about this time and gradual leakage had been taking place since.

3. The reflex irritation from the blood trickling over the peritoneal surface of the stomach might conceivably have caused the vomiting.

4. The gastric pain complained of during the four days previous to admission must have been due to the enlarged spleen.

5. The attempts at vomiting prior to and after admission had dislodged a clot in the rupture and caused the fatal hæmorrhage.

6. The slow pulse of 80 per minute at the time of collapse did not suggest so serious a complication as hæmorrhage.

Note.—The failure to detect the enlarged spleen was due to the hurried examination of the moribund patient. I have once before, while on active service, seen a case of rupture of the spleen.

When stationed at Ain Tab in Syria, an Egyptian labourer was evacuated to that place by motor ambulance from the Ak Su Valley, a very highly malarious locality about 15 miles away over a pretty atrocious road.

On arrival he was dead and a ruptured spleen was found on post-mortem, due, I have no doubt, to the almost continuous bumping of the ambulance during the journey. I made no records of this case.

A CASE OF SCORPION-BITE.

By DR. MILTON C. LANG, M.D.,
American Evangelical Mission, Baitalpur, Via Bhatapara,
Central Provinces, India.

The following case is reported, not because scorpion-bite is uncommon here, but because, at

least in this section of the country, such a severe reaction following the bite is not only rare but unknown.

On the 6th July, 1926, the patient S., while at work, was bitten on the great toe of the left foot. From the time of the bite until he arrived for treatment, fifteen minutes elapsed; but some over-zealous person put on a ligature of rope over the dorsum of the foot anterior to the ankle, where of course, it was useless, because of the absence of soft parts.

When the patient reached the dispensary he complained of great pain and general weakness.

Examination showed a young man about 22 years old, evidently in great pain. The skin was cold, clammy, and showed cutis anserina. On the left great toe was a perforation from the scorpion-bite, but the parts were not swollen. Respirations were rapid, as was the pulse. He had an urgent desire to urinate and was able to do this at first. He vomited several times, then became semi-conscious, very restless, and began to froth at the mouth. In conscious moments he complained of severe pain throughout the body, but especially in the chest and the bitten leg. There was much cough and expectoration of froth, which gradually became blood-stained (light red in colour, no definite flecks of blood). He showed all the symptoms of severe shock. Temperature 96.2°. Pulse imperceptible at the wrist, but apex beat heard faintly with stethoscope at the rate of 136. Respiration much embarrassed. Blood pressure—only an occasional beat could be heard at 80 mm. The whole body was bathed in cold sweat.

Examination of the chest revealed signs of generalized œdema of the lungs. The lips became cyanotic. Symptoms increased until it seemed that death was imminent.

In lucid moments the patient desired to void urine and fæces, but his efforts were unavailing for about one hour; he then passed a stool and somewhat later about 250 c.c. of urine.

After about 2½ hours, he improved sufficiently to be carried to his home, but for two days was unable to work, complaining of generalized pains, especially marked in the chest. He ran no fever.

As noted above the bladder was empty before the severe symptoms came on. The examination of the urine passed during the acute illness showed the following:—

Acid, specific gravity 1018, albumen four plus, sugar negative (Benedict's). Microscopic examination showed in each field an average of five hyaline and finely granular casts, and in addition many leucocytes, a very occasional red corpuscle, some bladder epithelium and debris.

Two days later, 8th July, the urine was again examined with the following results:—clear, acid, amber, specific gravity 1018, albumen a very faint trace, sugar negative. By microscopic examination only a very occasional finely granular or hyaline cast, some squamous epithelium and a few shreds were seen.

As to therapy:—

Local:—The wound was incised and tincture of ferri perchloride applied.

General:—as indicated:—

Whisky, aromatic spirits of ammonia, caffeine by hypodermic injection, atropine sulphate 1/50 grain by hypodermic and mouth, hot tea; because of the urgency of symptoms warm saline infusion under each breast, heat to the chest and abdomen.

The scorpion, which was shown to me after it had been stepped upon and thus more or less crushed, was small, only about 5 cms. long. The only difference that I saw in the hasty glance at it was that its colour was somewhat darker than those one usually sees. Unfortunately the specimen was lost, but it would be interesting to know more about this variety.

In this district the usual symptoms are simply severe pain in the part bitten, swelling of it, occasionally slight shock. This all passes off in about one hour and the patient is quite well.

In this case the venom had a marked effect on the kidney, and alveoli of the lungs. However in both instances it was but of a transient nature.

A CASE OF FRACTURE OF THE CALVARIUM.

By SARASI LAL SARKAR,

Civil Surgeon, Noakhali.

THERE is a peculiarity in the articulation of the two parietal bones with the frontal bone at the top of the skull. The anterior border of the parietal bone is deeply serrated and is bevelled at the expense of the outer surface above and of the inner below. The border of the vertical portion of the frontal bone is thick, strongly serrated, bevelled at the expense of the internal table above, where it rests upon the parietal bones, and at the expense of the external table at each side, where it receives the lateral pressure of those bones. Thus the articulation of the central portion of the frontal bone with the innermost portions of the two parietal bones is different from the articulation of these bones at their lateral portion.

This arrangement appears to be a biological necessity. For in the front of the head blows are likely to be received by the frontal bone. But as the portion of the frontal bone rests here upon the parietal bones, the effect of the blow is lessened by being transmitted and distributed to these parietal bones. On the other hand, blows on the sides of the head are likely to fall on the parietal bones; as the parietal bones in these portions of the head rest on the frontal bone, the effect of the blow is lessened, being transmitted and diffused through this bone.

However, this arrangement of articulation has its weakness. Suppose a blow is struck just at the junction of the sagittal and coronal suture, so that the impulse of the blow falls on the anterior superior angles of the two parietal

bones. The effect of the blow will have no chance of being diffused through supporting bones, but these angular portions will tend to become broken off, in the form of two triangular portions from each bone. A few years ago, I reported in the *Indian Medical Gazette* a case of post-mortem examination in which a man was struck forcibly with the end of a spade at this exact point. The result was a depressed fracture, with two triangular portions of bone broken off. The sides of these triangles along the coronal suture and sagittal suture were $1\frac{1}{2}$ inches each. The bases of the triangle were up to the point where the parietal bones got a resting point on the frontal bone. It can be inferred from the law of mechanics that a blow struck in the area covered by the area of these two triangles is likely to cause a depressed fracture.

The following is the description of a skull fracture found at post-mortem examination which I held at Makda on the 16th March, 1925, on the body of one, Haloo Santhal by name. This man received a blow on the frontal bone in the middle line in the line of the sagittal suture and somewhat in front of it. As the result of the blow the parts of the frontal bone on the two sides which do not rest on the parietal bones but support them became somewhat depressed, while the portion of the frontal bone which rested on the parietal remained fixed. The results were a few fissured fractures which started from about the point where there was interlocking between the frontal and parietal bones by the change in the method of suture. The fissured fractures were more evident on the internal plate of the bone than on the external plate. Evidently the force of the blow became lessened by being distributed through the frontal bone. Still this type of fracture appears to be the result of interlocking, which interferes with the free movement of the frontal bone as a whole from the effect of the blow.

The following is the description of the fracture from the post-mortem report:—

On removing the scalp, three fissured fractures were found on the top of the head. They all started from the fronto-parietal suture, the middle one running directly forward, and the two at the sides running forward and towards the middle line. The middle one was 1 inch long. That on the right side was about $1\frac{1}{4}$ inches long, and that on the left side about $1\frac{3}{4}$ inches long. These were situated at about equal distances from the middle point, i.e., the junction of the sagittal and coronal suture. On removing the skull cap the middle fissure was not found in the inner plate, but the two side fissures had met in the inner plate and had formed a triangle, the base of which along the fronto-parietal suture was $2\frac{1}{4}$ inches, and the sides roughly about $1\frac{1}{4}$ inches. The left side of the triangle was somewhat sinuous. There was partial separation of the fronto-parietal suture outside the base of the triangle and there was considerable hæmorrhage over the dura mater.

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NOVEMBER.

THE ACTION OF EMETINE.

THAT there is no drug comparable to emetine in its immediate clinical effect on infections due to *Entamoeba histolytica* is probably the experience of every medical practitioner in the tropics. Manson-Bahr (1925) states that "emetine injections, uncombined with other treatment, appear to be insufficient to eradicate an amœbic infection from the bowel, though they are undoubtedly of very great value in the acute stage of the disease." Yet, although emetine alone may fail to eradicate an infection with *E. histolytica*, its immediate clinical effect in cases of acute amœbic dysentery and of amœbiasis of the liver is very striking. There are several proposed substitutes for emetine, yet no other drug which after the injection or administration of a single dose will so relieve a patient suffering from acute amœbic dysentery of pain, tenesmus, the frequent passage of stools containing blood and mucus, and discomfort within twenty-four hours. The effect of the drug in cases of acute amœbic dysentery is indeed magical. Before its administration the stool may be found full of actively motile *E. histolytica*, with blood and mucus; after the administration of one grain hypodermically and twenty-four hours' rest in bed there may be neither blood nor mucus, whilst it may be impossible to find a single vegetative form of *E. histolytica* on microscopic examination. So marked indeed is the effect of the drug that it is useless to examine the stools of a patient who is under emetine treatment for *E. histolytica*; only after cessation of emetine treatment is it of any use to commence re-examination of the stools. When this is done, it is usually found that although the emetine injections have effected a clinical cure, yet they have not "sterilised" the patient of infection with *E. histolytica*. In brief, the acute condition of amœbic dysentery has been converted into the almost symptomless carrier condition. Yet, despite all its defects, the medical profession in the tropics owes an immense debt of gratitude to Sir Leonard Rogers for the introduction of emetine in the treatment of amœbic hepatitis, for instance, has recently been noted in our columns by Acton (1926), who admits that in the case of emetine we have a real cure, and not a supposed one.

The action of emetine on *Entamoeba histolytica*, then, must be presumed to be a profound one, although—in therapeutic doses—perhaps not an entirely lethal one.

How does emetine act on the amœbæ? This problem has for years been one of the most

puzzling in tropical medicine. Sir L. Rogers and the earlier workers with the drug supposed, on the strength of experiments in which emetine was made to act upon cultures of free-living amœbæ, that the drug was directly lethal to the motile, vegetative forms of the parasite. It was soon asserted that observations on free-living amœbæ could not be interpreted in terms of action upon tissue-invading entamœbæ, and that the action of emetine on *E. histolytica* was not a direct and lethal one, but an indirect one. Indeed there sprang up a school of investigators who investigated the action of different classes of drugs upon many different protozoal infections of man, and whose labours—although of very great interest—have not tended to clarify the problem. What the medical profession has been in search of for many years in such infections—in malaria, in kala-azar, in amœbiasis, in sleeping sickness—has been some mythical *therapia sterilans magna*; some wonderful product, the injection of a single dose of which will "sterilise" the patient of parasites, yet will not damage him or his tissues to any appreciable extent. This search—we believe—is a search after the unattainable; whether the drug be No. 3094 or No. 9056, although its immediate introduction may be hailed as a complete solution of the problem, further experience always teaches that it has to be administered in repeated doses and over a prolonged period of time to effect a complete cure.

In fact such studies appear to ignore the fundamental query as to how these protozoal parasites produce the symptoms of disease. When we have gained a complete grasp of the answer to this great riddle, then—and only then—shall we be in a position really to improve our therapeutic methods in connection with such diseases. Why should *E. histolytica* infection produce in nine persons out of ten only an almost symptomless "carrier" state, but in the tenth person acute amœbic dysentery or amœbic hepatitis? In our editorial for last month we have attempted to shew the factors which may underlie this question; but this, and many kindred problems call urgently for solution, before we can make real progress in therapy. To take the case of "surra" for example, it is not the mere mechanical presence of the causative parasite, *Trypanosoma evansi*, in the blood of infected animals which causes death. Repeated subpassage of the infection in susceptible animals, such as white rats, may lead to the evolution of a strain which kills uniformly in two and a half days after intraperitoneal injection of a standard dose. Yet it is often noted that, some hours prior to the death of the animal, the total number of trypanosomes in the blood falls instead of rising; the trypanosomes commence to die off before the death of the host; in such a tropical climate as that of Calcutta not a single viable trypanosome may be found on prolonged search of films taken from the viscera of an infected

rat half an hour after its death, although the count a few hours prior to death of the host may have been as high as half a million trypanosomes per cubic millimetre of blood.

Bacteria produce toxins, toxins which we can in many instances isolate and test experimentally, toxins which are capable of producing the symptoms of the disease in the entire absence of the causative bacteria. And against such toxins, antitoxins are produced by the infected body. But in the case of chronic protozoal infections, such as the amoebic "carrier" state, or in a population of children in a hyper-endemic centre of malaria, the trend of evidence goes to shew that what is acquired against the protozoal parasites is not immunity—due to the formation of anti-substances in the blood of infected persons—but rather a "tolerance" to a low grade of persistent infection. And in the course of centuries of evolution this tolerance may become of immense importance. Thus it is now generally held that *Trypanosoma brucei* is the same parasite as *Trypanosoma rhodesiense*. In the wild game of South Africa *T. brucei* has become tolerated; it is present in some 5 to 47 per cent. of the wild game in different areas in and around Rhodesia, but in these animals it produces no symptom of disease. Should drought or other cause reduce the number of wild game, the infected tsetse flies take to feeding on domestic animals, such as cattle, and in them the parasite is not yet acclimatised and produces the disease known as "nagana"; finally the infected tsetse may feed on man, and as man is as yet almost a stranger to this infection, sleeping sickness results, and the parasite in its "humanised" strain is known as *Trypanosoma rhodesiense*. At least, such a view is one which is very generally entertained.

Thus, in the case of prolonged and persistent protozoal infections, the ultimate struggle is that of man *versus* parasite. Man may ultimately overcome the parasite by his resistance, and this process is usually by active phagocytosis on the part of the macrophages of the blood and of the reticulo-endothelial system generally. Or he may acquire a tolerance to a low grade of infection, a condition of unstable equilibrium which is always apt to be disturbed by such factors as intercurrent disease or other cause which will lower the resistance of man.

Hence, in treatment of such infections, we have different methods open to us. We may firstly try to raise the resistance of man against the parasite; this avenue of approach to the solution of the problem appears to have been extraordinarily neglected during the past twenty years; the search for the *therapia sterilans magna* has obscured it. Yet it is not unimportant. Thus the very fine work of Schern (1925) on trypanosomiasis infections in general shews that in acute trypanosomiasis the rapidly multiplying swarms of trypanosomes require blood-sugar for their nutrition. This they draw from the blood. At first the liver responds by an increase in its glycogen metabolism, but, by degrees, the liver fails

to respond to the demand, absolute hypoglycæmia sets in and causes death. There is a big field of investigation awaiting the biochemical research worker who will take up the study of the glycogen metabolism of the body in its relationship to acute and chronic protozoal infections.

The more obvious avenue of approach is to try and kill the parasites without damaging the patient. We doubt if it can be done; it is true that the antimony treatment of kala-azar is extraordinarily successful, but even here there are considerable difficulties. In the "resistant" cases antimony appears to depress the patient's powers, whilst being inactive against the parasite. Further it is not infrequently the case that the treatment may reduce the infection to a low ebb; but, after treatment spleen puncture still shews the presence of parasites; yet—without any further treatment—the patient's own powers of resistance finally exterminate the infection.

Is there no possibility of an intermediate and safer course of action? In the case of most of these protozoal infections we are using drugs which are highly toxic to the patients concerned. Can we not so balance results that the infection may be scotched, and the patient's own powers of resistance so raised that he can deal with the low residual infection himself?

Thus, to return to our example of emetine. The view gradually gained ground that emetine has no direct action on *E. histolytica*. Its action was presumably an indirect one; it perhaps formed some wonderful emetine-metabolite in the tissues which was lethal to the amoebæ,—although no one succeeded in isolating or demonstrating the existence of such an emetine-metabolite. Dale and Dobell (1917) found that, within the limits of the experimental method which they employed, emetine and cephaeline did not appear to be more—but in fact less—poisonous for *E. histolytica* than the other ipecacuanha alkaloids and their derivatives; and that a solution of emetine of 1:1,000 strength might fail to kill the parasite in several hours. They concluded that emetine kills *E. histolytica* in some indirect method. A suggestion which was put forward in the literature was that emetine might so permeate the red blood corpuscles as to render them distasteful to *E. histolytica*, which might then starve. But *E. histolytica* normally feeds on the predigested tissue juices prepared for it by its proteolytic ferment; although red blood corpuscles are ingested by this parasite, they appear to serve merely as the *hors d'œuvres* to its more nutritious meal of tissue juice. In fact the mode of action of emetine on *E. histolytica* remained a mystery; its use was as purely empirical as that of potassium iodide in syphilis.

The first workers to clear up part of the problem were Sellards and Leiva in 1923. These workers studied acute experimental amoebic dysentery in the kitten. In the kitten the disease differs very markedly from acute amoebic dysentery in man. In place of localised and deep ulceration of the colon mucosa, widespread infection

of the mucosa occurs, necrosis lays bare large areas of the infected mucosa, and the blood stream is consequently often invaded by pyogenic cocci from the gut. Death tends to occur very rapidly, is associated with acute emaciation and anæmia, and appears to be more often due to invasion of the blood stream by pyogenic cocci than to actual amœbic dysentery. Hence successful treatment of acute experimental dysentery in infected kittens is a much more difficult problem than in man. The writer has twice succeeded in saving such experimentally infected animals by administering a single intramuscular injection of 5 mgms. per kilo. weight of kitten, but has not dared to administer a similar dose—equivalent to a single dose of about 6 or 7 grains of emetine—to man.

Yet such kittens can be saved, as shewn by Sellards and de Leiva. These authors show that subcutaneous injections of emetine are badly tolerated in the cat, and produce toxic symptoms. Experimenting with cultures of free-living amœbæ of "limax" type, they found that emetine proved toxic in a dilution of 1 : 1,000,000; quinine hydrochloride in a strength of 1 : 100,000; and benzyl-benzoate in suspension in a strength of 1 : 10,000. In adult cats the course of an experimental infection with *E. histolytica* is much more like that in man than is the case with kittens. Emetine given subcutaneously to cats was very toxic, but it proved far less toxic when administered *per rectum*. Hence they commenced to treat infected cats with emetine *per rectum* in a strength of 1 : 1,000 solution until a total of 20 to 22 mgms. per kilo. weight of cat was reached. This dose proved successful. The authors conclude that the best method of administration of emetine in human cases of amœbic dysentery is *per rectum*; and in man a total course of 18 to 30 mgms.—i.e., 17 to 28 grains—should be administered in divided daily doses to secure this result. This dosage corresponds closely with the recommendation of Wenyon and O'Connor (1917, p. 133) to give 1.5 gr. of emetine daily for twelve consecutive days (1 gr. hypodermically plus 0.5 gr. orally). Finally, *Castela nicholsoni*, a plant of the family *Simarubaceæ*, proved to be almost as efficacious as emetine. The authors conclude that the action of emetine is a direct one; it has a direct—though weak—action on *E. histolytica*; when given continuously and in sufficient doses it is possible to exterminate the infection, even in experimental animals.

The story is carried still further in a recent paper by Dobell and Laidlaw (1926). In our editorial for last month we remarked that the successful cultivation of *E. histolytica* *in vitro* by Boeck and Drbohlav in 1924 was likely to soon lead to an increased knowledge with regard to this parasite and the therapy of amœbiasis. Dobell and Laidlaw's paper had not then come to hand; it gives a striking instance of how such new knowledge may be applied.

Dobell and Laidlaw have especially studied the action of emetine, iso-emetine, cephaeline,

demethoxy-emetine, noremetine, psychotrine, and methyl-psychotrine on cultures of *E. histolytica* and of the other intestinal amœbæ of man *in vitro*. And their conclusions are as follows:—

(1) Emetine and cephaeline have been found to be specific poisons for *Entamœba histolytica* under cultural conditions.

(2) For this amœba (in culture) these alkaloids are at least 50 times as poisonous as iso-emetine, psychotrine, methyl-psychotrine, demethoxy-emetine or noremetine.

(3) For this species also emetine has been found to be about 10 times as poisonous as Stovarsol, and about 50 times as poisonous as quinine—under identical conditions of experiment.

(4) *E. coli*, *E. nana*, and *E. gingivalis* were found to be relatively insensitive to the presence of emetine in culture; *E. coli* being able to withstand a concentration of the alkaloid at least 100 times that which is lethal to *E. histolytica*.

(5) The effects of solutions of emetine on *E. histolytica* are peculiar. Very strong concentrations (1 per cent. or more) are needed to kill this parasite instantaneously; but only very weak solutions (1 in 50,000 or less) are necessary to kill if allowed to act for a sufficient time.

(6) In view of these findings it is concluded that the curative effects of emetine in human amœbic dysentery are best explained as a result of the direct lethal action of the alkaloid on *E. histolytica*.

In view of the work of Sellards and de Leiva, and of Dobell and Laidlaw, it is legitimate to conclude that emetine exerts its effect by a direct—but weak—parasitocidal action on *E. histolytica*. Its action on the cyst of *E. histolytica* does not yet appear to have been investigated by any worker; indeed it is very doubtful whether any drug administered subcutaneously, intravenously, or by the mouth could affect so resistant a structure.

But the lessons from this work are obvious. If we can afford—more or less—to ignore the "carrier" state as one which is almost intractable to treatment, yet the condition of acute and of chronic amœbiasis must be thoroughly treated, whether intestinal or hepatic. And the treatment must be continuous.

Now, as shewn by Chopra, Ghosh and De (1924), and by many other workers, emetine is a drug which is highly toxic to the human system. It is a cardiac and central nervous system depressant, it causes irregular intestinal peristalsis, and—especially if given orally or intravenously—vomiting. Hence we are up against a position in which balanced judgment is necessary. Given a patient with acute amœbic dysentery—the diagnosis having been confirmed by the microscopic finding of motile *E. histolytica* in the dysenteric stool,—we have the following facts to consider:—

(a) That the ulcerated gut must have as much rest as possible. This means bed for seven days, no matter what are the patient's wishes, and

the use of a bed-pan. It is even more imperative in cases of chronic and relapsing amœbic dysentery.

(b) That the administration of emetine must be continuous; yet a total course of about 10 to 12 grains must not be exceeded (hypodermically, intramuscularly or intravenously); and the pulse must be watched throughout.

(c) Emetine must be continuously present in such concentration that in the mucous membrane of the colon it reaches a concentration of 1 : 50,000 or more, if it is to have a parasitocidal effect.

(d) The environment in which the entamœbæ multiply is probably acid in reaction, and steps should be taken to render it alkaline. (If one may pass a criticism on the work of Dobell and Laidlaw, it is that they appear to have entirely neglected the influence of the reaction of the environment in which emetine acts. Acton (1921) has shewn that the action of quinine on *Paramœcium caudatum* is seven times as efficacious at a pH of 8 as at a pH of 7; and the influence of the degree of acidity or alkalinity of the substrate in which emetine acts may be profound.) Hence steps should be taken to combat any acidity present in the ulcerated gut.

(e) The diet must be restricted and should be such that alkalinity rather than acidity in the colon is favoured.

If we are to meet these pre-requisites, we would suggest the following scheme of treatment for cases of acute or of chronic and relapsing amœbic dysentery:—

(1) The diagnosis having been proved in the laboratory, compulsory rest in bed for seven days, with use of bed-pan.

(2) To correct any acidity in the gut contents and gut wall, the best method is probably that of intensive bismuth treatment, originally introduced by Deeks in Panama in the pre-emetine days; and now combined with emetine therapy. Connor (1918) at the Ancon Hospital in Panama reports over 100 cases of amœbic dysentery successfully treated between the years 1914 and 1918 by the combined method. Bismuth subnitrate is given in large doses; two drachms or more, suspended in water or milk, about every four hours, supplemented by a daily hypodermic injection of emetine. The bismuth probably adsorbs amino- and other acids in the gut, and also affords a protective coating to the ulcerated gut wall. It is important that the bismuth subnitrate shall be pure, as only if a pure preparation is employed can the large doses be tolerated.

If the medical attendant is afraid of prescribing such large doses of bismuth, an admirable substitute is Morson's Osmo-kaolin. This is an electrically precipitated very pure kaolin, entirely non-irritant, and can be prescribed in large doses suspended in water or milk.

(3) If a concentration of 1 : 50,000 of emetine is to be attained and maintained in the mucous membrane of the colon, a daily dose of one grain of emetine hypodermically will be insufficient. Willmore (1923) advocates supple-

menting the hypodermic administration of emetine by giving emetine *per rectum*, mixed with ether and suspended in olive oil, but even when so given emetine is apt to be very irritant to the gut, and more harm than good may be done by administering it *per rectum*. A better plan would probably be to give one grain hypodermically, and systematically every twelve hours until a total of 10 to 12 grains has been reached. Two grains of emetine per day can be tolerated by a patient who is in bed, and whose pulse is being watched, but it would probably be quite unsuitable for out-patient treatment. According to Vaccarezza (1921) failure with emetine is usually due to employing too small a dose or to stopping the treatment too soon; he gives $2\frac{1}{2}$ grains daily for not more than four days, or $1\frac{1}{2}$ grains daily for not more than seven days. One grain given hypodermically every twelve hours for five—or at most six—days would, therefore, probably be tolerated without much discomfort.

(4) At the end of such a five or six-day course of treatment, the question will arise as to whether the infection has been eradicated or merely scotched. As the work of Wenyon and O'Connor and of Dobell has shewn, nothing but repeated examination of the stools after the cessation of all treatment will determine this. The best plan is to examine one stool a week for seven or eight weeks. If seven or eight such examinations fail to shew *E. histolytica* cysts or vegetative forms, the infection is probably eradicated.

(5) Of the several proposed substitutes for emetine, Stovarsol was tested by Dobell and Laidlaw and was found to be ten times less efficacious against *E. histolytica* *in vitro* than was emetine. Most recent workers report that, to be successful, Yatren should be given by the combined method, both orally and *per rectum*, when it is very successful. This method is suitable for private patients in a nursing home, but scarcely suitable for general hospital work. Kurchi bark (*Holarrhena antidysenterica*) is an old and favourite Indian remedy in cases of amœbic dysentery. Unfortunately the Indian bazar infusion or "liquid extract" is both unstandardised and bitter to taste. Yet Brown (1922) has shewn that conessine—the active alkaloid of the bark—has a strong amœbicidal action, which compared very favourably with that of emetine. Doses of two to three drachms of the liquid extract t.d.s. can usually be well tolerated by an adult patient; but the B. W. & Co.'s "Tabloid" Extract Kurchi Corticis is much pleasanter to take. The "Tabloids" are of 5-grain strength, and 30 to 40 grains a day may be prescribed for an adult. The "Tabloid" preparation is remarkably well tolerated; it is now available in India from Messrs. Smith, Stanistreet & Co., Ltd., Calcutta; the agents of Messrs. Burroughs Wellcome & Co. Unfortunately the price of the "Tabloid" preparation on the Indian market is rather high. In view of the very real value of this drug both

in the primary treatment of amoebic dysentery, and even more so as a follow-up treatment after a course of emetine, it is to be hoped that the price may be reduced. Clinically, the patient suffering from amoebic dysentery makes a somewhat slower recovery on kurchi treatment than on emetine, but if kurchi given by the mouth should prove to be an efficient substitute for emetine given hypodermically, the treatment of amoebic dysentery in India will be both simplified and, we hope, cheapened.

The value of a standard line of treatment for a disease can only be really tested in a controlled population, since in Indian hospitals generally the patient is lost sight of after he leaves hospital. It is in such institutions as the Army in India, where every soldier has his medical history sheet, or in jails, etc., that the real value of any suggested remedy can be followed up by weekly or monthly re-examination of the patient after his discharge from hospital. The treatment of amoebic dysentery is at present in a confused state, owing to the number of different remedies suggested; reports that do not contain information as to repeated examination of the patient's stools after all treatment has been stopped are of no value at all. Clinically emetine is just as efficacious—indeed more so—than the more recently introduced remedies. The evidence which we have reviewed goes to shew that it has a direct, although rather weak, action on *E. histolytica* in its vegetative phase. Its action clinically, however, appears to require to be supplemented, and the investigation of the best line of treatment for amoebic dysentery is a matter which we trust that those in a position to do so—i.e., medical officers in charge of controlled populations—will take up.

R. K.

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SPECIAL ARTICLES.

REACTIONS FOLLOWING THE ADMINISTRATION OF THE PENTAVALENT COMPOUNDS OF ANTIMONY: AN ANALYSIS OF CASES REPORTED BY SEVERAL CORRESPONDENTS.

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DURING the last year we received a large number of reports of cases in which there was a reaction after the administration of one of the pentavalent compounds of antimony. Some of the reports have been published during the last few months in this journal. The essential details of these reports bear a marked similarity to one another, so we have not published each individual report, and for the same reason we felt that it was worth while collecting and summarising them.

The reports on 13 cases from 5 different sources are given below:—

Dr. M. N. Bhowmik of Murshidabad District reports the following cases:—

Case No. 1.—Hindu male, aged 29. Apparently a case of kala-azar; diagnosis clinical.

Preparation. Urea-stibamine (Brahmachari).

Time of appearance of symptoms. Early stages of treatment.

Dose given which caused symptoms. 0.05 gramme.

Nature of symptoms. Urticarial rash appearing within an hour or so and disappearing the same day.

Note.—Tolerance was eventually established and no symptoms were noted after the 6th injection. Twenty-one injections were given.

Case No. 2.—Hindu female, aged about 15. Aldehyde reaction strongly positive.

Preparation. Urea-stibamine (Brahmachari).

Time. Early stages of treatment.

Dose. 0.025 gramme.

Symptoms. Urticarial rash appearing within about two hours and disappearing on the same day.

Note.—Eight injections were given; the treatment was changed to sodium antimony tartrate for a few injections and then to Stiburea (Union Drug Co.). With

this preparation she complained of 'heat inside the body.' Twelve injections were given and cure was completed.

Case No. 3.—Female patient. (No further details given.)

Preparation. Urea-stibamine (Brahmachari).

Time. After the sixth injection.

Dose. 0.15 gramme.

Symptoms. Rigor and collapse. Rapid recovery.

Case No. 4.—Hindu male, aged 17. 'A case of kala-azar'.

Preparation. Urea-stibamine (Brahmachari).

Time. After the seventeenth injection.

Dose. 0.2 gramme.

Symptoms. Shivering after last five injections, coming on about one hour after injection and lasting about 2 hours.

Case No. 5.—Hindu male, aged about 18. 'A case of kala-azar'.

Preparation. Urea-stibamine (Brahmachari).

Time. From beginning of the course of treatment.

Dose. 0.1 gramme.

Symptoms. Rigor and bleeding from gums, about one hour after each injection.

Symptoms increase with increase of dose.

Dr. A. C. Nag, M.B. (Cal.), of Bagerhat, Khulna, reports the following case:—

Hindu girl, aged 13 years. Early case, diagnosed clinically. Urea-stibamine and sodium antimony tartrate were given alternately, 25 injections altogether. Three months later the patient relapsed and further treatment was administered.

Preparation. Amino-stiburea.

Time. After the third dose.

Dose. 0.1 gramme.

Symptoms. Burning sensation all over the body. The face became flushed and eventually cyanosed, swollen and oedematous. The patient was collapsed and she vomited.

Adrenalin chloride was administered and the acute symptoms disappeared within half an hour.

Dr. A. Paul of Chilmari, Rangpur, reports two cases:—

Case No. 1.—'A Mahomedan lady suffering from kala-azar'. The patient had previously had two injections of Urea-stibamine.

Preparation. Stiburea. (Union Drug Co.).

Time. After the third dose of this compound.

Dose. 0.2 gramme.

Symptoms. Collapse and urticarial rash, oedema of the larynx and loss of voice.

Adrenalin was sent for but symptoms disappeared before this was administered.

Case No. 2.—An adult male who had previously had kala-azar and was apparently suffering from a relapse.

Preparation. Stiburea. (Union Drug Co.).

Time. After the ninth injection.

Dose. 0.2 gramme.

Symptoms. Collapse immediately after the injection was given. A sense of suffocation. Adrenalin was administered and later digitalin, after which the symptoms all subsided.

Drs. K. L. Basu Mallik, M.B. and Bhupendra Mohu Roy of the Ludlow Jute Company, Chengail, Howrah, report the following case:—

Hindu male, aged about 26 years. Aldehyde reaction positive. Four months previously he had received 4 injections of Urea-stibamine.

Preparation. Amino-stiburea.

Dose. 0.2 gramme.

Time. After the first injection.

Symptoms. Burning sensation all over the body followed by extremely severe muscular pain. The voice became husky; he was collapsed and sweated profusely. Later, the patient had painful contraction of the muscles of the jaw, vomited and passed into a semi-stuporous state. Adrenalin and later strychnine were administered and the patient recovered completely in a few hours.

Dr. S. N. Chatterjee, M.B., of Bangada, Jessore, reports a number of cases.

Case No. 1.—Patient 27 years of age, suffering from kala-azar'. A few preliminary injections of sodium antimony tartrate had been given.

Preparation. Urea-stibamine (Brahmachari).

Time. After the eighth injection.

Dose. 0.15 gramme.

Symptoms. Sense of suffocation. Sudden rise of temperature and pulse rate. Urticarial rash all over the body. The symptoms lasted about one hour. Subsequently injections gave rise to similar but less severe reactions.

Case No. 2.—Boy aged 9 years. Suffering from kala-azar.

Preparation. Urea-stibamine (Brahmachari).

Time. After the ninth injection.

Dose. 0.1 gramme.

Symptoms. Convulsions and collapse. After administration of adrenalin the temperature rose to 106°F.; the pulse rate rose and an urticarial rash appeared. The symptoms subsided within the day.

Case No. 3.—Boy aged 6 years. A kala-azar case of six months' duration.

Preparation. Urea-stibamine (Brahmachari).

Time. After the sixth injection.

Dose. Not stated.

Symptoms. Sense of suffocation; rise of temperature and pulse rate; urticarial rash.

Case No. 4.—Girl aged 15 years. A case of kala-azar, duration 1½ years.

Preparation. Stiburea. (Union Drug Co.).

Time. After the twelfth injection.

Dose. 0.2 gramme.

Symptoms. Sense of suffocation. Redness of the eyes and swelling of the face. An urticarial rash. Rapid pulse and high temperature. The acute symptoms subsided in half an hour.

The conditions under which these reactions occurred and the symptoms which occurred can be summarised as follows:—

The preparation causing the symptoms.—In eight of the cases reported Urea-stibamine was the compound used, in three cases Stiburea, and in two cases Amino-stiburea. The symptoms shown in the various cases could not be grouped according to the compound used, although perhaps the severest symptoms were shown by one of the patients receiving Amino-stiburea.

The time of appearance of symptoms.—In the majority of cases the symptoms appeared after one of the later injections, from the 6th to the 17th injection; in three cases in which the patient had previously received injections of one of the pentavalent compounds symptoms appeared at the beginning or at least early during the subsequent course of injections; and in three cases only, in all of which the symptoms were very mild, they appeared early during the first course of injections.

The dose causing the first symptoms.—In most cases it was the maximum dose which caused the first symptoms but again in most of these the maximum dose had been administered previously without giving rise to any symptoms. In one instance a dose of 0.025 caused mild symptoms.

The nature of the symptoms.—In two cases a severe shivering attack lasting for about two hours was the main symptom. The rest of the cases showed symptoms which varied only in degree in the individual instances. These symptoms appeared very shortly after the injection had been given, usually in the following order:—The patient had a burning sensation all over the body; the eyes became puffy and there was swelling of the face; an urticarial rash appeared on the face and all over the body; there was a sensation of suffocation, apparently caused by œdema of the mucous membrane of the throat, which was in some instances followed by loss of voice and in others by severe dyspnoea; in a few instances there was a marked rise of temperature and pulse rate, but in the most severe cases there was collapse and vomiting; and in one instance the patient passed into a semi-conscious state.

In most cases the treatment with the particular preparation was abandoned but in some of the cases, in which there was only a mild reaction, it was persisted with and tolerance was eventually established.

The symptoms usually disappeared rapidly, but in a few the swelling of the face persisted for 24 hours. Adrenalin chloride was administered in a few cases and digitalin and strychnine were given to combat the collapse, but in most cases the symptoms disappeared without any treatment.

The writer has had similar experience with these compounds:—In one case, that of a child aged 2 years, the third dose of 0.1 gramme of Amino-stiburea caused vomiting, diarrhoea and complete collapse. Subsequent minute doses,

0.02 gramme, caused a recurrence of the symptoms. In a number of other instances the urticarial rash and swelling of the face has been observed after the 6th, 7th or 8th injection of all three of the compounds referred to above.

Discussion.—All the symptoms suggest anaphylaxis; the patients had been sensitized by previous injections. The symptoms were not due to an overdose in the ordinary sense of the word, as most of the patients had previously received doses as large as the one that caused the symptoms, nor were the symptoms those of antimony poisoning.

The symptoms are extremely alarming, but in none of the cases reported above was the issue fatal. Such symptoms are not reported in cases treated with the antimony tartrates, nor have I had similar experiences in cases treated with certain other pentavalents, although I have now had considerable experience with a number of these; it is, therefore, probable that the reaction, is not due solely to the antimony molecule. Neither is the frequency of the occurrence of these reactions nor their severity sufficient to cause any one to hesitate about using the preparations that produce them. The great decrease in the death rate amongst treated cases that has been effected since the pentavalent compounds were introduced is an irrefutable argument in favour of adopting these in the place of sodium antimony tartrate whenever possible.

Precautions.—It is, however, as well to remember that such reactions may occur and to make provision for their occurrence. There seems to be little doubt that adrenalin cuts short the attack and that strychnine and digitalin accelerate the recovery where the patient is collapsed. A further precaution that should be taken in all dispensary cases is to allow the patient to rest for some minutes after receiving an injection so that the symptoms do not make their appearance when the patient is in the street. In a case in which these symptoms have occurred the greatest caution should be exercised in subsequent administration. It will be as well to make the next dose not more than one-tenth that of the one that caused the symptoms, and then to increase the dose cautiously.

In cases where a severe reaction has followed one of the first few injections, it will be as well to substitute some other pentavalent compound in the particular case.

STERILITY: YESTERDAY AND TO-DAY.

By V. B. GREEN-ARMYTAGE, M.D., M.R.C.P. (Lond.),

MAJOR, I.M.S.,

Professor of Clinical Gynaecology and Obstetrics,
Medical College, Calcutta and Second Surgeon
to the Eden Hospital.

A witty Frenchman once said of the English that they had fifty different religions, but only

one sauce. And I think one may say of the general practitioner that he has fifty different nostrums, but only one operation, for sterility.

With a view to correcting this misconception, it may be of some service to review our knowledge of the matter in the light of recent work, and particularly with reference to the value of the Rubin per-uterine tubal insufflation test; for with the onset of the cold weather, many a soul is left disappointed, and many a practitioner left distracted, when Time—the arbiter of all things—proves that conception has not occurred.

The types of sterility that I am going to discuss are those seen every day by the busy practitioner, and in order to make my meaning clear on this point I am taking for consideration 300 consecutive cases, as they have presented themselves to me in my consulting room.

In 64 of these (21.3 per cent), the husband was at fault.

In 50 (16.6 per cent), no satisfactory cause could be discovered in either husband or wife, after full examination.

In 45 (15 per cent), the complaint was one-child sterility.

In 141 (47 per cent), the fault was primarily or certainly in the woman.

Such being the case, it will repay us to halt, and consider each of these categories.

As regards the first, the husband may be old, or he may have a history of epididymitis, or syphilis, or he may be psychopathic, or unintelligent in the art of love. Such cases can easily be investigated by efficient examination of the semen in a condom. Such examination must be done within a very few hours of coitus.

Azoöspemia is in my experience incurable; but I have seen excellent results following rest, mild thyroid medication, and diathermy, in oligospermia. Total abstinence, and if possible separation of the parties for not less than three months, must be a part of the treatment. Some of these cases are complicated by a very definite psychological complex; by this, I mean that due to some subconscious trauma of earlier days, which has not been ventilated, a man may develop an anxiety neurosis or inferiority complex. These cases are best dealt with by an expert psycho-analyst. However, I wish to make it quite clear that the most intimate enquiry must be made of, and about the husband, before necessarily proclaiming that the wife is the cause of the sterility. For I am afraid scores of women undergo unnecessary operations in order to bolster up the amour-propre of a defective husband.

In 50 cases no adequate cause could be assigned for the sterility, despite full examination of both husband and wife (including a Rubin test on the latter), but I have a feeling that a time will come in the near future

when semen will be "grouped" in some way to suit a woman, just as blood is grouped for direct transfusion. For from a knowledge of the private lives of some of these patients, I know that they have had left-handed children, or children by a former spouse.

Moreover, I feel quite sure that many of these cases are due to the prolonged use of contraceptives after marriage, for there can be no doubt that such abominations as quinine pessaries, cervical caps, etc., set up an endocervicitis, which is inimical to the passage and vitality of the spermatozoa. Indeed, I do not think the fact is sufficiently recognised that if women constantly use contraceptives during the first three years of married life, only a fractional proportion of them ever conceive. Some authorities state that only 10 per cent of such become pregnant.

One-child sterility is very common among the people of India, and when it is remembered that 50 per cent of Indian women and 12 per cent of European women in India suffer from fever of some kind after delivery, such one-child sterility need not be wondered at. It may be that the perineum is so badly torn or the vagina so lax that the patient is always wet after coitus, or there may be such atresia or laceration of the cervix with ectropion and erosion that the chances of fertilisation are few, but most often there is a condition of chronic metritis, that is a congested, bulky, and retroverted uterus, with or without salpingo-oöphoritis, and this is the fundamental cause.

The prospects of these patients are to a large extent dependent upon expert examination. For instance, the perineum or cervix may need suturing, or some plastic operation.

On the other hand, if there is old inflammatory disease of the tubes, which have become completely glued, and surrounded with adhesions to the ovary, no treatment for sterility *per se* will be of any avail, although of course operation may cure the chronic invalidism of these patients. But if there is no palpable disease—by this I mean that the tubes and ovaries are not enlarged or painful, and that the only finding is a retroverted bulky uterus (probably the result of inefficient treatment, or neglect of vaginal examination three weeks after the baby was born)—there are two things which can be done.

1. The diagnostic per-uterine insufflation test of Rubin.

2. Remington Hobb's treatment.

It is possible that the first, for lack of the adequate apparatus or experience, cannot be carried out, but there is no reason whatever why any practitioner should not carry out the Hobb's treatment, which is simplicity itself, for I have records already of 11 cases where this treatment alone has resulted in conception at a later date—cases in which every

known treatment, even including that much-abused operation of Gilliam—has been employed.

Here, may I say in parenthesis, that the general practitioner's custom of ordering glycerine and ichthyol tampons, or inserting a pessary, is not only useless, but an anachronism to-day. And the same thing may be said of the embryo gynaecologist who believes that a Gilliam operation for a retroverted uterus is the *ultima Thule* of treatment, for in these cases, as the uterus is in a state of chronic congestion or subacute inflammation, no mere restitution of its position will influence its conceptive power. For as Rubin has demonstrated, and as I have incontestably proved, if CO₂ passes with ease through the tubes without undue pressure with the uterus retroverted, there is no indication for Gilliam's operation, if sterility is the purpose thereof; but, if the CO₂ does not pass easily or only passes under excessive pressure, or after first anteverting the uterus, one must presume that there is a mechanical kink or swelling of the mucous membrane of the tubes, and then Hobb's treatment before or after a Gilliam operation is astoundingly gratifying in its results.

The Hobb's Treatment.—The principle of this treatment is the introduction of glycerine into the uterus, which promote exosmosis from the endometrium, that is to say there is an outpouring of lymph from the uterus, and its place is taken by fresh lymph from the circulation. Glycerine is a mild stimulant to the uterine muscle, it rehabilitates its tone and contractibility, and as it slowly percolates through the cervical canal it washes out that viscid secretion, which so often blocks the entrance.

Instruments required.—

- (1) A sponge holder.
- (2) A No. 6 soft rubber Jacques' catheter.
- (3) A bivalve speculum, or a posterior speculum and an anterior vaginal retractor.
- (4) A 10 c.c. "Record" syringe.

Technique.—No anæsthetic is necessary. The patient is placed in the lithotomy position, the vulva is cleansed as usual, and the speculum introduced. The cervix is manipulated into a central position, and cleansed with a swab-stick and iodine. The "Record" syringe is filled with pure glycerine, and the soft rubber catheter is attached to the end of the syringe. The catheter end is grasped lightly by the sponge holder, introduced into the cervix, and pushed right up to the fundus; the glycerine is then slowly injected, so that an even spread over the uterine mucosa is obtained. If the patient is in bed, the catheter is left *in situ* with gentle packing to keep it retained in the vagina, the treatment being repeated t.d.s.; but if not in bed, the patient should return for treatment every day, for not less than 21 days.

In Calcutta, I find it best to ask one of the many reliable lady doctors to carry out the treatment after the first application; that is after the patient realises that there is no pain or disability entailed.

The patient is asked to report herself in a month, for by that time one usually finds the uterus small, mobile, and no longer tender to palpation. While this treatment is being carried out, the patient is told to take $\frac{1}{2}$ gr. of thyroid extract twice a day, to rest from 12 noon to 4 p.m. on her face, with the foot of the bed raised, and to submit to some form of Plombiere treatment, that is to douche herself rectally with hot normal saline or 1 grain of permanganate of potash to 2 pints of hot water twice a day, for many of these cases have an œdematous or varicose condition of the parametrium.

Coitus is absolutely forbidden for three months. The treatment is repeated on 15 days in the second month, 10 days in the third month. The husband is instructed to be with his wife on the 7th, 9th, and 11th days after the last day of the third menstrual period, for those are the days of elective procreation, corresponding with the date of ovulation in women, which takes place between the 13th and 17th days after the first day of menstruation.

It may help to emphasise this fact, if the practitioner will remind his patient that the Jews are the most prolific race in the world, and that the Mosaic law does not permit the orthodox Jew to cohabit with his wife until after the 7th day following the last day of menstruation.

Before quitting the subject of Hobb's treatment, I should like to add that this treatment, so simple and efficient for drainage of the uterus, is of extraordinary value in cases of puerperal sepsis, for each application relieves congestion, lowers the temperature, and alleviates pain. Moreover, it is very useful in cases of abortion with retained products of fertilisation which have become infected.

Finally, in cases of one-child sterility, where all treatments have been tried, reference should be made to the modern treatment by diathermy. This method should only be used by an expert, but the reports of such cases as have been treated show that it is a very valuable means of resorting health to a tender, congested uterus, thereby perhaps rendering the nidus for conception normal.

Faults in the Woman.—From a clinical point of view, such faults can be divided into psychological, anatomical, and pathological. Out of the 141 cases seen by me, 11 (7.8 per cent) belonged to the psychological category, by which I mean that extreme frigidity or vaginismus existed. These cases are very difficult to treat, since as a rule there is no anatomical defect or cause for such reluctance.

Suggestion, mental massage, or vaginal glass dilators before, or after a "Fenton" operation are sometimes successful. Little can be expected

of drugs such as valerian or nux vomica, for it is the art of love that is defective in the husband or wife, or both.

Anatomical defects are in my experience very common; 63 cases (44 per cent) had defects of the vagina, cervix, uterus, or its adnexa.

Developmental errors are far more frequently causes of sterility in women than practitioners realise, and it may be that faults in development are results of dietetic errors (avitaminosis), together with endocrine failure in foetal or early life up to the age of puberty.

Gross clinical conditions, such as congenital absence of, or non-development of the sexual organs; or lesser ones, such as the tented vagina, that is one contracted at its vault, the snout-shaped or button cervix, the anteriorly or posteriorly acutely flexed cochleate uterus with small insensate ovaries, or the small round pelvis, are all frequently seen.

Dysmenorrhœa is usually a symptom, and such patients often are obese below the navel, and have a failure in development of the breasts, pubic or axillary hair. Some are short, and have loose joints, and large tonsils. Others have absence of the half-moons of the finger-nails, or small black moles (beauty spots) all over the body, or spaced and twisted upper lateral incisor teeth. These accessory clinical signs point to hypothyroidism, or hypopituitarism.

Treatment of these cases is extremely unsatisfactory from the point of view of curing the sterility. Perchance $\frac{1}{2}$ gr. of thyroid extract twice a day, with large doses such as 10 grs. each, three times a day, of whole ovarian and pituitary extract for six to twelve weeks, may be beneficial. I have only known two of these patients to become pregnant and go to full term, although such symptoms as dysmenorrhœa, obesity, and dyspareunia may be alleviated.

Pathological conditions of the pelvis existed in 67 (48 per cent) of the whole number of cases seen by me.

A careful history will elucidate whether a patient at any time since marriage has had any inflammatory condition of infective origin which might possibly have affected the genital organs and pelvic peritoneum. For instance, 18 cases gave a history suggestive of gonococcal infection; 7 had a history of severe appendicitis and operation in the acute stages; 11 had a history of abortion followed by fever for periods from 3 days to 3 weeks; 2 were definitely tubercular, and their pelvic findings suggested tubercular salpingitis; 3 had had operations for extra-uterine gestation.

Pelvic examination will demonstrate morbid conditions of the urethra, Bartholin's glands, or cervix; for instance, a hypertrophied, cedematous cervix eroded, and with a bull's eye appearance points to an infective condition of the endocervix. Bimanual examination will at once give the clue by pain and tenderness as to the position and condition of the uterus, tubes, and ovaries, for any inflammatory condition, old or

recent, of these structures will be palpable, and should the practitioner be in doubt, a combined vaginal and rectal examination will clinch the diagnosis as to the cause of sterility.

That tubo-ovarian disease, inflammatory in origin, is extraordinarily common, both in private and in hospital practice cannot be doubted. Among my own cases they form 12.7 per cent of the whole, and in the Eden Hospital, Captain Dutt, the Registrar, shows that they form 13.6 per cent of all gynaecological outpatients.

Other morbid conditions causing sterility, under the age of 28, or after three years of marriage, were ovarian and dermoid tumours, 9 in all.

But still more common in my series were neoplasms of the uterus (17 in number) including polypi of the cervix or fibroids of the corpus uteri.

In a few patients, although the history was suggestive of infection or definite of abortion, except for a retroverted uterus and prolapsed ovaries, no other morbid condition was discoverable.

Treatment.—An infected cervix by itself may be cured by diathermy, or by Hobb's treatment, or if these fail, by a Sturmdorff operation, which excises the mucous membrane of the endocervix.

A tubo-ovarian mass may eventually demand operation, but such treatment is very rarely followed by conception. In connection with these operations it may not be out of place here to sound a warning against laparotomy should there be a history of a miscarriage or abortion within the year, for "puerperal" tubo-ovarian masses are in 80 per cent of cases streptococcal in origin, and hence there is a risk of infecting the peritoneal cavity and death.

The cases which demand the greatest clinical acumen are those in which the history is indefinite, the clinical findings are negative, and where apparently there would seem to be no reason why conception should not have occurred. It is in these patients that the value of the Rubin insufflation test gives us that hope and information, which hitherto we have had no means of entertaining.

In 1914 Rubin first began his experiments on insufflation, and now the technique is so perfected that the gynaecologist can use it in his consulting room as a routine method of diagnosis in cases of sterility, provided that his technique is good, that the patient is seen at a favourable time with regard to the menstrual cycle, that the cervix is healthy, and that there are no contra-indications.

The writer uses Rubin's own apparatus or that of Dr. Provis. These are both portable and inexpensive. No anæsthetic is necessary, in fact an anæsthetic should on no account be used. A vaginal examination having been made to eliminate any contra-indications, the patient is placed in the lithotomy position, a bivalve speculum is

inserted, the cervix is grasped by a single pointed vulsellum, and cleansed with iodine on a probe. The cannula connected to the CO₂ apparatus is now passed into the cervix above the level of the internal os. The CO₂ cylinder is connected with a pressure gauge and the CO₂ passed through an inverted U tube in water. The gas is now turned on at a very slow rate (approximately three bubbles to the minute), and the manometer is closely observed in order to determine the point at which the pressure drops. This "pressure drop" indicates the point at which the gas is released through the tubes into the peritoneal cavity. If the tubes are patent, this is usually under 100 mm. of mercury. If the tubes are closed there is no drop, and the pressure rises steadily to 200 mm. or more. The cannula and vulsellum are then withdrawn. The patient is asked particularly as to the character and location of any pain produced, as such points are of diagnostic value. For instance, if the pain, as the pressure rises, is only in the middle line, or on one or other side of the groin, the probabilities are that there is a block in one tube or both, as the case may be.

If the gas has run through at a pressure of 100 mm. or less, and not more than three bubbles emitted per minute (roughly 100 c.c. of CO₂) the patient is asked to sit up on the couch. Confirmatory evidence of the patency of the tubes will be then established, for she will complain of sudden pain in the right or left shoulder region, due to rising of the gas under the diaphragm. (Rubin uses a fluoroscope, which he has fitted up in his consulting room.) Such pain can be abolished by asking the patient to adopt a knee-chest position for five or ten minutes, for the CO₂ then reverts to the pelvis and is quickly absorbed.

Contra-indications and Dangers.—There must be no evidence of pelvic infection or suppuration, no pelvic tenderness, or inflammatory masses, and no fever. She must not be a patient who is suffering from cardiac, renal, or pulmonary disease, nor be one of great obesity. The danger of embolism is negligible if the test is done properly. The only possible danger is an extremely rare one, namely, that of blowing pus from the tubes into the peritoneal cavity, either through the fimbriated end, or from the bursting of a tube under excessive pressure. But this should not be possible if a proper examination has been made beforehand.

Choice of Time.—The most favourable time to carry out the test is from 4 to 7 days after the cessation of menstruation, when the endometrium is flat, and the uterine ostia of the tubes are not obstructed by swollen mucous membrane. Moreover, such a time is of additional importance from the fact that if the test is positive the husband can be with his wife during the following three nights with a greater chance of conception occurring.

Repetition of the Test.—If the test is negative, on no account should the patient be told that

conception is impossible, for although circumstances may predispose one to think so, it may be that there has been some spasm of the tubes during the test, which has prevented the passage of the CO₂. For that reason the test should be repeated on two, or three occasions, under morphia and atropine if need be. Rubin himself states that several of his patients proved to have tubal patency on a fourth test and subsequently gave birth to normal children. Moreover, it may be that the second and third tests indicate from the symptoms of the patient that the block is at the distal end of the tube, the so-called "phimotic" tube adherent to the ovary. In such a case, laparotomy, followed by salpingostomy and removal of the thickened outer covering of the ovary, may be successful.

Deductions.—Until recently the operation most beloved of the general practitioner for sterility was that of dilatation and curetting, with or without slitting of the posterior lip of the cervix. Should this small operation fail in its purpose, the patient usually drifted to the gynaecologist for further opinion, and if he found the uterus retroverted some modification of Gilliam's operation, perhaps, would be performed; but should the uterus be in its normal position—which was as likely as not—and the husband healthy, another dilatation would be done!

Nowadays, however, all such tinkering gynaecology has gone by the board, for obviously any operation on the cervix or uterus will be ineffectual if the tubes are already sealed to the passage of the ovum.

Rubin's test is therefore a diagnostic measure of the very greatest importance; so should any patient with a healthy husband, after two or three years of marriage, seek advice for sterility—provided that there are no contra-indications—an insufflation test should be done before submitting her to any operation.

Moreover, it must be remembered that this test, if positive, has also a therapeutic effect, for the observations of over twenty independent surgeons have proved that this test alone, without any other treatment whatever, has resulted in conception in over 10 per cent. of sterile patients—probably by dislodging a plug of mucus or straightening out a kink in the tubes.

If the test is negative on three or four occasions, the probabilities are very much against any chance of conception—operation, or no operation. For instance, the writer has done 33 salpingostomies, and has yet to see one of these women become pregnant, and this is the usual experience of most surgeons.

If the test is positive, on the other hand, any measure should be taken which may enhance the chances of fertilisation. For instance, Hobb's treated uterus, a Gilliam or Sturmdorff operation, or trachelorrhaphy, or sometimes the simple operation of dilatation and curetting.

Never insert a pessary for a retroverted uterus associated with sterility. In those cases where the uterus is mobile, retroverted and the tubes are patent, but an abdominal operation is not desired, excellent results may be obtained by adopting a modification of the technique devised by the late Dr. Williamson. A T-shaped incision is made in the vagina in front of the cervix, the bladder is pushed up and the anterior peritoneal pouch opened. The anterior surface of the uterus is lightly grasped with a single pointed vulsellum and brought forward. Catgut sutures, two or three in number, are now passed horizontally from side to side through respectively the pubo-cervical fascia, the cut edges of the anterior vesical peritoneal pouch, the sub-peritoneal surface of the uterus one inch below the fundus, and then emerge through the same structures on the opposite side. The ligatures being tied and the wound closed, the uterus is now anteverted and held forwards by a light adhesion of peritoneum which is in the nature of a vaginal suspension ligament. The writer has done this operation on a great number of occasions for prolapse of the ovary, dyspareunia or sterility. In a small proportion recurrence may occur due to faulty ligatures or faulty adhesions but in no case has abortion occurred. Eleven cases have gone to full term and had no difficulty whatever at delivery. In 5 of these however, the uterus had dropped backwards after the childbirth and had to be temporarily rectified by pessary. The operation is not difficult, is painless, and keeps the patient in bed only 8 to 10 days.

As regards the operation of curetting and dilatation which undoubtedly is occasionally followed by conception, it is the opinion of the writer that such success is due to four factors:— (1) suggestion; (2) removal of unhealthy or callous mucous membrane; (3) relaxation of the spasm of the circular fibres of the cervix; (4) the fact that the passage of solid Hegar's dilators up to 11/14, probably forces a column of air which is in "the cylinder" of the uterus through the tubes and acts like an insufflation. This column of air possibly dislodges a plug of mucus which has been blocking the tubes hitherto, for undoubtedly slow dilatation of the cervix with Hegar's solid instruments is followed by greater success than the use of tents or of Hawkins-Ambler's hollow dilators.

From the above facts it will be seen that the diagnosis and treatment of sterility is a matter of extreme clinical importance, which demands the keenest acumen and scientific investigation before advising haphazard operations.

Therefore, in the future, let us hope, we may hear less frequently, from a disappointed husband or wife, that well known lament:—

"Myself when young did eagerly frequent
Doctor and Saint, and heard great argument
About it and about; but evermore
Came out by the same door as in I went."

Current Topics.

The Bulletin of Hygiene.

A new departure on the part of the Bureau of Hygiene and Tropical Diseases, London, is one which calls for notice on the part of our readers. Prior to 1926, the *Tropical Diseases Bulletin* published four quarterly supplements a year on hygiene. With effect from January 1926, this practice has been discontinued, and instead a new journal—the *Bulletin of Hygiene*—has been published monthly.

It is quite impossible for the medical man or the public health worker to keep abreast of the times by reading only text-books or only one or two medical journals. The literature is rapidly becoming too enormous for one to absorb it. Hence the very special value of such abstract journals as the *Bulletin of Hygiene*. Each month a very wide series of papers, dealing with every possible aspect of hygiene and public health, published in many different journals and different languages all over the world, is most carefully reviewed and abstracted. The journal is admirably published; thick glossy paper being interleaved for reproduction of half-tone plates. Its editorial committee is a very strong one, its contributors include Lieutenant-Colonel J. A. Anderson, R.A.M.C.; Major-General Sir Wilfred Beveridge, A.M.S. (retd.); Major Greenwood; Colonel L. W. Harrison, R.A.M.C. (retd.); Dr. E. L. Kennaway; Dr. E. D. Macnamara; Dr. E. Mellanby; Dr. A. J. Martin; Dr. W. G. Savage; Lieutenant-Colonel G. E. F. Stammers, R.A.M.C. (retd.); and Dr. W. M. Willoughby, amongst others. The honorary managing committee has Dr. Andrew Balfour, Sir David Bruce, Sir Havelock Charles, and Sir Walter Fletcher on it, representing the Medical Research Council, and Professor C. J. Martin, representing the Royal Society. Dr. A. G. Bagshaw is Director of the Bureau.

With such a managing committee, staff, and contributors, the success of the new journal is certain; but the knowledge of its existence should be broadcasted. It is exactly the journal which the busy public health worker must have; by reading it he can cover up-to-date the progress made in every part of the field of hygiene and public health, whilst the full and detailed references given will enable him to look up any particular paper in which he is especially interested in the original. The new *Bulletin of Hygiene* is a worthy companion to the invaluable *Bulletin of Tropical Diseases*, and to say so is to give it very high praise indeed.

The Bureau of Hygiene and Tropical Diseases, 29 Endsleigh Gardens, London, W.C. 1, now publishes the following review bulletins:—

(1) The *Tropical Diseases Bulletin*; published monthly; annual subscription, including postage abroad, 21s. This is absolutely essential to every medical worker in the tropics, and we cannot imagine how any such medical man can get on without it. Month by month it reviews the entire field of tropical medicine, dealing with the aetiology, prevention and treatment of all tropical diseases, and including special sections on tropical surgery, ophthalmology, mental diseases, etc.

(2) The *Bulletin of Hygiene*; published monthly; annual subscription, including free postage abroad, 21s. This is absolutely essential to every public health worker in the tropics, and of great interest to laboratory workers everywhere.

(3) The *Tropical Veterinary Bulletin*. Whilst the special appeal of this admirable review journal is to veterinarians, it yet contains a wealth of information for the laboratory worker and parasitologist. It is published quarterly; the annual subscription, including free postage abroad, is 10s.

We have come across medical men in remote parts of the mofussil, who did not know of the existence of these admirable review bulletins—(and some of whom did not even know of our own existence!). A medical man

practising in the tropics requires information about tropical diseases; the advance of tropical medicine is so rapid that any text-book is out of date in about four years; the Home medical journals do not deal especially with tropical medicine,—although the *Lancet* and the *British Medical Journal* are honourable exceptions; and the three bulletins mentioned above exactly fill that want.

The Cancer Review.

THE output of literature on cancer is now immense, and it is utterly beyond the powers of any one individual, no matter how widespread his reading, to keep abreast of it. There are to-day a hundred and one aspects of the cancer problem,—physiologists, pathologists, surgeons, biochemists, experimental biologists, statisticians, radiologists, parasitologists, one and all are at work upon it from different points of view. Hence to the individual the wood is apt to be lost to sight on account of the trees.

As a result, the Council of the British Empire Cancer Campaign have decided upon the issue of a journal which will abstract, number by number, all the more important papers which appear dealing with the cancer problem from every possible different aspect. The publishers are John, Wright and Sons, Ltd., Bristol—(the well-known publishers of the *Medical Annual*); whilst the Indian agents are Messrs. Butterworth and Co. (India), Ltd., Calcutta; Messrs. Thacker, Spink and Co., Calcutta; and Messrs. Thacker and Co., Bombay. Ten numbers are to be issued each year, and the annual subscription is 30s. per annum. The first number was published in July 1926.

On the Managing Committee we note the names of Major Greenwood, Mr. Sampson Handley, Mr. Lazarus-Barlow, Dr. Archibald Leith, Mr. Lockhart-Mummery, Professor C. J. Martin, and Dr. J. A. Murray. On the Editorial Committee occur the names of Dr. Francis Cavers (General Editor); Dr. William Cramer of the Imperial Cancer Research Fund; Dr. Cuthbert Dukes of St. Mark's Hospital; Dr. Shaw Dunn, Professor of Pathology, University of Manchester; Dr. E. L. Kennaway, Chemical Pathologist to the Cancer Hospital Research Institute, London; Dr. P. J. Kerley of the Middlesex Hospital; and Mr. C. A. Pannett, Professor of Surgery, St. Mark's Hospital. With such a roll of distinguished names upon the managing and editorial committees, it need hardly be said that the journal will constitute a very authoritative and most important review of the whole of the cancer problem.

The first number runs to 80 pages, and reviews or abstracts no less than 159 papers, etc., from a very wide range of journals; it deals with the general, experimental and biochemical, clinical and pathological, radiological and statistical aspects of cancer, the papers reviewed being grouped in that order.

The new journal will appeal to an enormously wide range of readers. It is one which by broadcasting reviews of all advances in our knowledge of the cancer problem from every point of view, will aid very materially in forwarding the study of the problem. The multitude of medical journals is to-day overwhelming; one sometimes wishes that some international tribunal could be formed—perhaps under the aegis of the League of Nations—to decide which should discontinue publication or be burnt, and which should be fostered and officially approved. But, in a very crowded world of medical journalism, this new journal will be a beacon light to many different classes of medical workers interested in the cancer problem.

The Complications of Duodenal Ulcer.

By CECIL ROWNTREE, F.R.C.S.,

Surgeon to the Cancer Hospital, and to the Dreadnought Hospital.

(*The Practitioner*, No. 697.—Vol. CXVII, No. 1,—July 1926.)

Few cases of duodenal ulcer that are untreated for any length of time escape the addition to their normal

symptoms of one or other of the more serious complications, which adequately treated cases usually avoid.

The only symptom of duodenal ulcer that is constant, persistent, and typical, is pain. It is true that it may vary in its character, its situation, or its periodicity, but every patient with a duodenal ulcer will at some time or another experience pain, which may be in bouts or spasms, may disappear for weeks or months at a time, may be much better in summer than in winter, but is none the less the one symptom that takes him to the doctor. He may not state categorically that the pain comes on one and a half to two hours after meals, no matter what their nature, or that it is relieved by further food, or by one or other of the widely advertised remedies for chronic indigestion; but all these points can generally be elicited by careful inquiry.

These, then, are the normal symptoms of duodenal ulcer. To what are they due? Is the pain the result of the irritation of the raw surface in the duodenum by the acid gastric juice, or is it due to spasmodic contractions of the gastric muscle induced by the presence of the ulcer? We know that in duodenal ulcer the muscular activity of the stomach is increased and that the food is unduly hurried from it, but in spite of this the x-rays do not show those irregular spasmodic contractions that are such a regular feature of gastric ulcer. It is easier to believe that the pain is chiefly due to the action of the gastric juice which is hurried into the duodenum before its acid content has had the opportunity of becoming neutralised.

Perhaps the most dramatic feature of the disease is the small size of the lesion which produces such far-reaching effects, for the ulcer is rarely much larger than the finger nail, and sometimes no more than a few millimeters, and yet it may convert a strong, hearty, and happy man into an ill-tempered, dyspeptic invalid.

The number, variety, and severity of the complications of duodenal ulcer seem out of all proportion to the insignificance of the primary lesion and it is difficult to find a satisfactory method of classification. Perhaps the most simple is to divide them into the acute and the chronic.

Acute Complications.

In this class we have hæmorrhage and perforation, and of these hæmorrhage is the more common. Every degree of bleeding is met with, from a slight oozing, which is only detected after careful investigation of the stools for occult blood, to a devastating loss resulting from the erosion of a large vessel, which possibly kills the patient forthwith. But fatal hæmorrhage is very rare; even hæmorrhage profuse enough to cause the duodenal contents to be emptied into the stomach and cause hæmatemesis is quite uncommon, the most usual indication of the bleeding being melæna, a symptom frequently overlooked owing to the fact that so many of these patients are taking bismuth, and the stools are black already. But the black tarry, sticky stool of melæna does not really very much resemble the dark constipated stool of bismuth, and there should be little difficulty in distinguishing them.

How should we deal with profuse hæmorrhage from a duodenal ulcer? Should an operation be performed, and an attempt made to seek the bleeding point? Most emphatically no, for these patients are in no condition to stand what may very likely prove to be a difficult and prolonged operation. Moreover, a single hæmorrhage very rarely kills—it is the recurrence of hæmorrhage that is dangerous. The indications therefore are to give morphia and hæmoplastin, empty the stomach by the Dreyfus tube and keep it empty by the same means; give saline by the rectum, and only begin to consider the question of operation when the patient is recovering.

The fact of hæmorrhage having occurred is an additional argument in favour of the operative as against the medical treatment of duodenal ulcer, and if operative treatment is selected do not wait too long, but as soon as the patient's general condition justifies it, transfuse and operate.

Acute perforation of a duodenal ulcer is a different problem, for here there is no room for discussion. The

case instantly becomes a surgical one and should be operated upon forthwith. No matter how big the hole in the ulcer, it can be closed, and the results do not depend upon any such factors as the age and sex of the patient, or the situation of the perforation, but upon the time that is allowed to elapse before the case is dealt with. The actual technique is fairly well established. The perforation should be closed as tightly as possible by suture and a patch of omentum carefully applied to the damaged area. The abdomen is then closed with or without drainage, dependent upon the time that has elapsed since the perforation took place, and the amount of soiling of the peritoneum.

Pin-hole perforation.—Most perforations are perfectly definite openings $\frac{1}{2}$ of an inch or more in diameter, from which the fluid contents of the duodenum escape with the utmost ease, but one occasionally meets with a case where the orifice is no more than a pin-hole, and the amount of material escaping is reduced to a minimum.

It is probable that these minute perforations occur with greater frequency than is suspected, undergo spontaneous closure, and then provide those cases we see sometimes of patients with rather indeterminate symptoms who, on exploration, are found to have the first part of the duodenum tightly glued to the under-surface of the liver.

In operating for perforated ulcer there is as yet no complete unanimity of opinion as to whether the gastro-enterostomy should be performed as well—that is to say, whether an attempt should be made to cure the ulcer, as well as the perforation. It adds an undesirable 15 minutes to the operation on a very ill patient, one is working with tissues already damaged, and the author finds that better results are obtained when nothing beyond closing the perforation is attempted.

Chronic Complications.

The chronic complications embrace a rather heterogeneous group of conditions, among which the following are the most interesting and important:—

Multiplicity of Ulcers.—The occasional occurrence of more than one duodenal ulcer in the same patient is not so striking as the undoubted fact that in the vast majority of cases the ulcer is single. Why should it be solitary? Why, moreover, should its usual situation be the anterior surface of the first part of the duodenum? It is suggested that this is the point where the acid gastric juice impinges when ejected from the stomach, but it is difficult to believe that the aim of the pylorus can be so true. The presence of a co-existing gastric ulcer is a well-established complication which is no doubt sometimes overlooked, particularly when situated high up on the lesser curvature. It is an important point to have this in mind as a possible cause of persistence of symptoms after gastro-enterostomy.

Peri-duodenitis and Adhesions.—It has already been indicated that one of the causes of adhesions round the first part of the duodenum may be the spontaneous healing by inflammatory exudate of a pin-hole perforation. It is not suggested that this is the cause in all those cases where the duodenum is firmly fixed to the liver or to the gall-bladder. A marked degree of peri-duodenitis may no doubt result from the escape of organisms through the base of an ulcer which has never perforated, and conversely, inflammatory conditions of the gall-bladder or bile ducts may spread to the duodenum and fix the two together by plastic exudate.

Deformity.—All ulcers tend to heal, and in doing so they produce scar tissue, but ulcers of the duodenum probably produce less than any other similar lesion. There is no comparison between the dense cartilaginous base of a gastric ulcer and the usual thin, papery floor of an ulcer of similar extent in the duodenum. Indeed, it is often impossible to feel a duodenal ulcer, the white and puckered base of which is perfectly obvious to the eye. Occasionally, however, one meets a case where induration and thickening are so marked as to produce considerable deformation of the duodenum, and even to

so much occlusion of its lumen as to lead to symptoms of pyloric obstruction.

Malignant Disease.—Primary carcinoma of the duodenum has been recorded in the literature, but its extreme rarity in this situation affords one of the greatest mysteries of the pathology of cancer. Cancer of the stomach is one of the commonest forms of malignant disease, yet only half an inch further on in the duodenum it is almost unknown. Yet here apparently are all the factors generally regarded as favourable to its development—a chronic ulcer, persistent for many years, and irritated night and day by acid gastric juice.

Post-operative Complications.

The surgical treatment of the duodenal ulcer is so systematized, so common, and so successful, that a consideration of the complications of the disease without including those attaching to its operative treatment would be incomplete. There is probably no other chronic disease in which there is such complete unanimity as to the best form of operative treatment. Posterior gastro-enterostomy holds the field against all rival methods, and is one of the most successful operations of surgery but like every other operation, it carries a definite though small risk, and every surgeon who has many of these cases is certain sooner or later to meet one or other of the following complications.

Pyloric Stenosis.—This may come either from the ulcer or from the suture line. There is no means of telling which, and it is wiser to be on the safe side and regard it as the result of an error of technique, and act accordingly. The abdomen should be re-opened without delay, the patient transfused, the anterior surface of the stomach incised, and that part of the posterior surface carrying the stoma everted through the incision. If no definite point of bleeding can be discovered, a complete circle of sutures should be inserted round the margin of the stoma, and the ulcer itself should also be underrun with stout catgut in case the bleeding is from this source.

Vicious Circle.—The regurgitant vomiting that results from the establishment of a vicious circle is one of the most anxious and perplexing of all post-operative complications. The difficulty in dealing with it arises from the fact that it is sometimes only a temporary condition, which time will cure, but if we wait too long the patient may die before the normal passage is re-established. It may result from several causes: the loop may be definitely and permanently kinked because it is too long, or too short—and it is obvious that in these cases nothing short of further operation will be of any use; or there may be a temporary blockage due to over-distension and folding of the loop of bowel; or a vein may be pricked during the suturing with the result that a hematoma is produced, which may be large enough to block the jejunum at its point of attachment to the stomach.

Failure to relieve symptoms after an apparently successful operation should at once suggest that the opening is not functioning, or that the disease was not in fact duodenal ulcer, or at any rate not solely that, and further investigation of the case should be instituted. The possibility of overlooking a co-existing gastric ulcer has already been referred to. The conjunction of the two is certainly not particularly rare for the author met with it in two consecutive cases a few months ago.

Early Diagnosis.

In duodenal ulcer, as in all else, prevention is better than cure, and most of the complications may be forestalled by successful treatment of the ulcer in its early stages. For this early diagnosis is essential, and there can be no question that in the vast majority of cases there is great delay. It is not a question of weeks or months, but of years before a definite diagnosis is arrived at and specific treatment instituted. Whether that treatment should be surgical or medical is still a subject of debate, and powerful arguments can be adduced in favour of either method, but broadly speaking it may be said that the choice really depends upon economic questions. Non-operative methods involve an exacting and prolonged period of rest and treatment, which may be

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highly successful for a time, but are often followed by relapse and the necessity for a further course of treatment. This is well enough for the leisured classes, but those who are dependent upon their own exertions cannot afford the time consumed by medical treatment, nor can they face the possibility of a further period of illness resulting from relapse. Such patients will choose to take the slight risk of operation and the much higher probability of complete and permanent relief from their symptoms.

On Counter-Irritation.

By EDGAR F. CYRIAX, M.D. (London, W.).

(*Practitioner*, May 1926, p. 382.)

COUNTER-IRRITATION in some form—usually in a very primitive form—is the principal form of treatment adopted by domestic amateur physicians in this country. Dr. Cyriax's classification of counter-irritation methods will probably be of interest to our readers.

For the convenience of description the applied therapeutics of a counter-irritant may be summarised under four headings:—(a) Application to the skin; (b) obvious stimulation thereof; (c) reflex impulses from the irritated cutaneous nerves to deep-seated areas (visceral or otherwise); and (d) resultant vascular changes in the latter. Now, if these definitions were to be rigidly adhered to, a large number of other agents which act very similarly would have to be excluded, for example:—

1. Those which conform to (a), (b) and (c), but which do not primarily produce vascular changes in the deep-seated areas, such as the following:—

(A) Rubefacients which, when applied to the lower dorsal area, induce irritation of the posterior roots, the anterior roots, the rami communicantes and the sympathetic nerves, finally inducing through the splanchnic nerves a condition of inhibition of the intestines.

(B) Rubefacients which, when applied to the neck, influence the inhibitory fibres of the vagus nerve. Amongst these may be mentioned the application of cantharides to the neck as performed by Brand and Johnson, who employed it with success in asthma, exophthalmic goitre, whooping cough, and sea-sickness. Mays stated that in cardiac irregularities he had found massage and cutaneous irritation over the vagus nerve to be of considerable benefit.

2. Those which produce exactly the same effect as counter-irritants applied, but do so through the deep-seated nerves from which spring the cutaneous ones affected by such counter-irritant; for instance:—

(A) "Nerve frictions" applied according to the methods of the late Henrik Kellgren. By this manipulation is meant the mechanical stimulation of a nerve induced by drawing one or more digits sharply across it. When such nerve frictions are applied to the deep-seated posterior spinal nerves as they lie embedded in the erector spinæ, many visceral changes may be thereby induced, such as constriction in the splanchnic area (as evinced by the rapidity with which a subject who has fainted can be revived by nerve frictions applied to the lower dorsal area), diminution in the size of the liver from vaso-constriction of its vessels (as evinced by diminution of its percussion dullness after nerve frictions applied to the fifth and to the seventh dorsal nerves on the right side), etc.

(B) Tapotement applied to localised areas near the spine, has been employed by the Swedes for nearly a hundred years for a variety of complaints in the thorax and abdomen, and induces its effect in very much the same way as nerve frictions.

(C) Tapotement applied with the closed fist or a special pleximeter over the actual spinal processes instead of at the side of the spine. This method, known as reflexotherapy or spondylotherapy, has been used by several workers in order to induce reflex vascular effects in the abdomen.

3. Those which conform to (a) and (b), but do so without any irritation of either the cutaneous or the deep-seated nerves, even in some cases diminishing it, if already present, as, for example:—

Vibrations according to the methods of the late Henrik Kellgren. When applied to localised areas at the side of the spine, by reducing the irritability of the nerves in that area they can induce reflex vascular effects in the corresponding abdominal organs.

4. Those which conform to (a) and (c) only primarily induce motor effects, any visceral ones being secondary; these are often referred to as counter-irritants. Thus, gentle stroking with a trembling motion on the left costal margin, which induces gastric peristalsis in atony of the stomach, is often designated as such, as is also the application of nerve friction to the posterior sacral nerves in inducing contraction of the rectum. The term counter-irritation is even applied to very gentle soothing vibrations applied over the temple in severe supraorbital neuralgia.

Reviews.

PROTOZOOLOGY, A MANUAL FOR MEDICAL MEN, VETERINARIANS, AND ZOOLOGISTS.—By C. M. Wenyon, C.M.G., C.B.E., M.B., B.S., B.Sc. (Lond.). London: Baillière, Tindall & Cox, 1926. In two volumes; pp. xxviii plus 1563, with 20 coloured plates and 565 illustrations. Price, £4-4-0 net.

For some time past his many friends have known that Dr. Wenyon was preparing a large manual of protozoology. And now that these two splendid volumes have been issued from the press, we do not know whom to congratulate most on their production; the author on his clear and masterly exposition of the whole subject of protozoology, his artist on the magnificent coloured plates and half-tone illustrations with which the volumes are profusely illustrated, or the publishers on their admirable enterprise in presenting such a work to the scientific world. The book is a masterpiece and it will become a classic; not since the publication of Minchin's "Introduction to the Study of the Protozoa" has there been an event of such importance in the protozoological world, whilst the present volumes dwarf Minchin's celebrated book and render it obsolete. We knew that such a manual published by such an authority would be of the greatest interest and importance; Dr. Wenyon is one of the foremost authorities in the world of protozoology, his contributions to the science have covered a very wide field, dealing *inter alia* with the entamoebæ, the coccidia and the *Herpetomonas-Leishmania* group; he was for several years Protozoologist to the London School of Tropical Medicine; as Director-in-chief of the Wellcome Bureau of Scientific Research he has had complete access to the whole of the literature. Yet even our happiest anticipations have been exceeded; this book forms the finest of all Dr. Wenyon's contributions to the science of protozoology; it will stand for many years to come as a monument to the credit of the British school of protozoologists.

A word must be said first as to the general get-up of the two volumes. The publishers have done their utmost in the author's interests, and the entire work is printed on art paper, with a substantial binding. This renders possible good reproduction of the artist's plates. And its illustrations are the very finest feature of the work. The coloured plates attain the very highest degree of perfection; vegetative *Entamoeba histolytica* as seen in an amœbic dysenteric stool is portrayed with striking accuracy; the cysts of the intestinal protozoa as seen in iodine solution are most accurately portrayed; the plate on vegetable organisms which may be mistaken for leishmania parasites should help in future to prevent

research workers from making many mistakes; the sections on leishmania and on the trypanosomes are enriched with admirable coloured plates; those of the sporogony cycle of the malarial parasites, as well as those of their schizogony cycle, are the very finest that we have seen. Further, the half-tone illustrations are splendid, and what is of special interest is the exceedingly numerous original plates and illustrations. Dr. Wenyon has not been content—as are so many authors—with reproducing old and often inaccurate figures by earlier workers; he has given us of his very best; to teachers of protozoology in all countries the illustrations will be invaluable for demonstration to students. Finally, two special sections of the book call for special mention. The splendid bibliography at the end of Vol. II covers 100 pages, and must include some 3,500 references. Everyone who has had to prepare papers dealing with a protozoological subject knows the enormous labour which such papers entail; the subject-matter of protozoology—prior to the publication of this work—was scattered throughout some 15 to 20 research journals over the past 20 years. To prepare a list of references for a paper meant days of searching through a large reference library. Dr. Wenyon's list of references however now constitutes a complete reference library in itself, and workers in many countries will owe him a debt of gratitude for placing it at their disposal. Finally, in another section of 62 pages, a complete list is given of all the blood-inhabiting protozoal parasites hitherto described in mammals, birds, reptiles, amphibians, insects and invertebrate hosts; the mere publication of such a list will be of inestimable value to hundreds of workers, and will materially aid in future in avoiding duplication of names, etc. for one and the same parasite. In brief, there is not a single aspect of the science of protozoology whose advancement will not be aided by the publication of these splendid volumes.

The systematist will be deeply interested in the book. In his classification of the Protozoa, Dr. Wenyon leaves the old, beaten and unsatisfactory track. The Sporozoa have long been recognised as a jumble of incompatibles. Hence the author takes the Myxosporidia and the Microsporidia out of this class, and re-groups them together as the class Cnidosporidia. This leaves the coccidia and the haemosporidia together in the sub-class Coccidiomorpha, together with the Gregarina in the same class; thus re-grouping the Sporozoa according to their natural affinities and clearing up the muddle about the whole class. The Ciliophora are sharply differentiated from the Plasmodroma—(which latter include all Protozoa in which syngamy occurs by the complete fusion of two gametes).—and rightly so, since the differences in structure and method of syngamy are profound in the two groups.

Turning to various sections of the book, that on the entamoebæ is of special interest, since Dr. Wenyon's pioneer work on this group is so well known. The illustrations here constitute a veritable picture gallery, and many or most of them are original and new. Dr. Wenyon wields a kindlier pen than does Professor Dobell, yet he is just as keen as is the latter authority on weeding out errors. Thus he will not admit the genus *Councilmania* as valid, and Fig. 15 of his illustration No. 101, shewing a hernia-like protrusion from a ruptured cyst of *Entamoeba coli* goes far to support his view. We turned with special interest to the section on the Trypanosomidae, since so many of Dr. Wenyon's original papers have dealt with this subject, and we were in no way disappointed. For years wordy warfare has waged concerning the true classification of this group. The muddle that has arisen concerning the correct definition of the genera *Crithidia*, *Herpetomonas*, *Leptomonas* and *Leishmania* is such that the same parasite may be referred to by half a dozen different authors under half a dozen different names. And here Dr. Wenyon's classification is admirable; the genera are re-defined and that in true accordance with the history of the literature. The genus *Crithidia* is here limited to invertebrate hosts; *Herpetomonas* becomes a very small

genus in this classification, it is limited to invertebrate hosts and infection is transmitted from host to host by encysted forms. The chief genus among the flagellate protozoa of insects now becomes *Leptomonas*, since there are supposed to be trypanosome forms in the genus *Herpetomonas*. *Leishmania* as a genus is sharply differentiated from *Leptomonas*; parasites of the genus *Leishmania* inhabit the bodies of vertebrate hosts, and the infection is transmitted from host to host by invertebrate hosts. Thus the former "herpetomonads" of the gecko, the chameleon, the silver fish and the dormouse now fall into the genus *Leishmania*, together with the parasites of human leishmaniasis. It is obvious that this is the right classification; not only is it in accordance with the history of the literature, it helps to differentiate the natural flagellates of insects from the hæmo-flagellates of man and other vertebrates.

The section on the coccidia is again admirable, and is illustrated with numerous plates and admirable microphotographs of the oöcysts. We need not enter into the discussion between Dr. Wenyon and Professor Dobell as to the validity of *Isospora belli* of man, but it is to be noted that Dr. Wenyon adheres to his own view—and in it is supported by Reichenow—that *I. hominis* of man is a doubtful parasite with a small oöcyst which may in reality be only the sporocyst of *I. belli* of man, and that the usual *Isospora* of man is *Isospora belli* Wenyon, 1923.

In the section dealing with the malarial parasites, the author is wisely conservative. He prefers to retain the name *Plasmodium falciparum* for the parasite of malignant tertian malaria, rather than *Laverania malariae*. *P. vivax*, *P. malariae*, and *P. falciparum* are, of course, valid; but *P. tenue*, *P. ovale*, *P. vivax* var. *minuta*,—which is probably identical with *P. ovale*, or rather *vice versa*.—and *P. perniciosum* are grouped together as doubtful species. This is the only attitude which can be held at present—at least in the reviewer's opinion; the evidence for the separate existence of these new species is still far from convincing. The coloured plates in the whole section on the plasmodia are admirable and will be invaluable to students; their colouring is just right—and not too faint as is often the case with coloured illustrations of the malarial parasites. The section on the piroplasmata is also excellent, and illustrated with an admirable coloured plate. Finally in Vol. II comes a special section on the spirochetes: although the spirochetes are not protozoa, yet protozoologists are frequently called upon to deal with diseases due to spirochetes; and this section, although brief, will again be of great value to laboratory workers everywhere. A final section deals with methods of technique and will be most useful. On pp. 1336 to 1349 is given the code of rules drawn up by the Ninth International Congress of Zoology in 1913 for the nomenclature of parasites; this information is badly wanted for the information of research workers everywhere, and will be very helpful in avoiding duplication of names, etc.

A special feature of the book is its zoological aspect, if one may use the term. Whilst its chief appeal will be to medical research workers, yet it will be invaluable to veterinary research workers. Dr. Wenyon in no way confines himself to the protozoal parasites of man; everywhere the protozoa of other mammals, birds, amphibians and insects are adequately described, and often illustrated by excellent coloured plates. The whole work is a mine of information. In still one further matter one would like to especially congratulate the author. A book such as this takes years to compile. In the meantime the subject is constantly undergoing modification; new papers are constantly appearing, new views set forward. Yet, probably at the cost of considerable labour, Dr. Wenyon has contrived by re-writing and adding sections to bring the work completely up-to-date. Thus the whole of the 1925 work in India on the transmission of kala-azar by the sandfly *P. argentipes* is briefly referred to, and all papers up to the end of 1925 and some 1926 papers are included in the bibliography. In the section on the coccidia the very recent

work of Thomson and Robertson (1926) shewing that the members of the genus *Eimeria* in man are in reality parasites of sardines and other fish is fully dealt with, and the eimerias of man re-named in accordance with this discovery.

It is impossible to really adequately review so monumental a work as Wenyon's "Protozoology." Although the book is fully up-to-date, yet it is the product of years of labour and research and fully matured. It is the product of a lifetime almost of original research and study. We fear that Dr. Wenyon has not solved the difficulties of the Indian undergraduate and post-graduate student; the book is beyond his financial means and also too exhaustive for him to study. But he has solved the problems of the protozoological, medical and veterinary research worker, and that in a splendid manner. A copy of this book should be in every medical library in India, in every research institute where protozoological problems are dealt with, in every scientific reference library, and in every protozoological laboratory. The book is one to study again and again; to have for constant reference. Its publication marks the beginning of a new era in the science of protozoology; it collects together the whole of the past in complete and beautifully illustrated form; it should form the foundation of the future. We cannot but again congratulate Dr. Wenyon on his splendid achievement.

R. K.

THE BIOLOGY OF THE INTERNAL SECRETIONS.—

By Francis X. Dercum, M.D., Ph.D. London and Philadelphia: W. B. Saunders, Co., 1924. Pp. 241. Price, 14s. net.

(We very much regret the delay in reviewing this little book, which was unfortunately mislaid, and only recently recovered.)

It is of special interest, because it is in effect an essay by a leading authority on nervous and mental disorders on the rôle of the internal secretions in such disorders; it is therefore somewhat off the beaten track of books dealing with the endocrine glands, and novel in its presentation of the facts. The author rightly insists that it is from the general biological point of view that the problem should be approached. The phenomena presented by the internal secretions are in their ultimate analysis problems of metabolism, and he therefore introduces the subject by a consideration of metabolism in unicellular and multicellular organisms respectively. In chapter 2 he points out that it is in the general clinic that we come across Nature's own experiments in disturbances of endocrine activities. Turning to a consideration of the development of the embryo, it is pointed out how important is the mesenchyme in connection with the lymphatic organs, and it would appear that it is disturbance or arrest in the proper development of this layer that underlies the many and varied conditions produced by endocrine deficiency or excess, especially since from it the lymphatic system and the thymus are evolved. The thymus in childhood, indeed, appears to play a dominant rôle over the other endocrine glands.

Following this come a series of chapters dealing with the different endocrine glands and the effects upon the body or mind of their dysfunction. Synergic and antagonistic relationships are considered. The sympathetic nervous system is then described, and the true sympathetic system differentiated from the autonomic; the duplex innervation of different structures of the body from both systems is commented on, and a brief discussion given on sympathetico-tonic and vago-tonic activities of the different endocrine secretions. "Imbalances" of endocrine activity, under- and over-compensations are then discussed, and the author puts forward interesting speculations—though we must admit that they are speculations—on the true causes of malignancy and their relationship to the endocrine system.

Finally, and of special interest in the book, is a discussion of the relationship of endocrine dysfunction to nervous and mental diseases. "Freaks" due to gross endocrine disturbance are relatively rare; but stigmata of the arrested development or deviation of the endocrine system are relatively common. In four chapters the author's views on the relationship of different endocrine glands to different mental states is described, and finally a consideration given of the rôle of heredity, acting through such glands, on the mental status of the patient.

In many ways a novel book with new aspects of the endocrine system, this little work will be of special interest to those working in the field of nervous and mental disorder.

ALLERGIC DISEASES, DIAGNOSIS AND TREATMENT OF BRONCHIAL ASTHMA, HAY FEVER AND OTHER ALLERGIC DISEASES.—By W.

Storm van Leeuwen, M.D. London: J. B. Lippincott Co., 1925. Price, Rs. 13-8 (18s.). Obtainable from Messrs. Butterworth & Co., Calcutta.

THE study of the allergic diseases, such as hay fever, most cases of bronchial asthma, many forms of urticaria, eczema and other skin diseases on modern lines was started only a few years ago, and it is very gratifying to note that many interesting results have already been achieved which have considerably helped to modify the old conceptions regarding the ætiology and treatment of these diseases. The term "allergic diseases" was introduced into medical literature by Cooke and other American investigators to designate a number of conditions which show one common characteristic, viz., hypersensitiveness to protein and other substances which are innocuous to normal people. The author deserves the thanks of the medical profession for bringing out this excellent handbook in English dealing with the subject-matter in a clear and comprehensive manner.

It is known that the sensitiveness of patients to different drugs varies from case to case. Extreme toleration on the one hand and extreme sensitiveness on the other to drugs like cocaine, novocaine, etc., on the part of different people is common knowledge to all. The author has discussed this subject ably and has referred to results obtained by various workers in the field with a view to elucidate the cause of the so-called idiosyncrasy. The subjects of hyper-sensitiveness to animal proteins, to food stuffs, and to bacterial products have been ably dealt with by the author.

The author next goes on to discuss the value of skin tests in relation to the ætiological factors of allergic diseases. His opinion about the value of skin tests is that the causative agent of the allergic attacks is seldom revealed by skin reactions "because there are no means by which the extracts used for making the skin tests can be standardised either chemically or physiologically." The author, however, believes that these extracts, if used intradermally, serve to indicate a difference between the behaviour of the skin of normal people and of allergics. The intradermal skin reactions may thus serve to diagnose the allergic state but are not helpful in making a specific diagnosis.

The chapter on the ætiology of bronchial asthma is very interesting reading. Apart from inherited predisposition or sensitization by injection of proteins (serum treatment, blood transfusion, etc.), one may acquire allergic diseases by prolonged contact with the allergens if some irritating substances are present to make the skin or mucous membrane more permeable. By way of illustration, the author cites cases of epidemic asthma described by Ancona, asthma caused by fur dyed with paraphenylenediamine (Cruschnann's cases), cases of ipecacuanha asthma (in which emetine might act as the irritating substance), and also cases where allergic diseases manifest themselves after intestinal ulcer or intestinal operation.

The treatment portion of the book has been admirably written. The specific treatment of allergic diseases is clearly described, and among the non-specific forms of treatment the author seems to lay great stress on the tuberculin treatment in these conditions. He gives full descriptions as to the technique, choice of the tuberculin preparation, different dosages, etc., and then gives a few typical illustrative cases in support of this particular line of treatment. He also mentions other and non-specific treatment, such as milk-therapy, peptone therapy, etc., and has ably discussed their merits and demerits.

In conclusion, the author lays great stress on treating all asthmatic subjects, whenever possible in miasma-free chambers, i.e., in a room which is hermetically closed, but ventilated continuously with air filtered so as to be free of miasms. The author is so much impressed with the good results following this pure air treatment in miasma-free rooms, that he entertains little doubt of its giving relief to every case of asthma, if the financial question of starting miasma-free rooms could be satisfactorily settled by people for whose benefit they would be established.

We warmly recommend the book to the medical public.

J. P. B.

AURICULAR FIBRILLATION.—By J. G. Emmanuel, F.R.C.P. Birmingham: Cornish Brothers, Ltd., 1926. Pp. 31. Price, 3s. 6d. net.

THE author delivered the Ingleby lectures in Birmingham in 1925 and this book contains the subject-matter of those lectures. It forms a complete description of this rather complicated condition. The various theories of its causation are reviewed and the author is of opinion that the chief cause is a toxæmia. He supports this view with clinical facts, and especially stresses the fact of its frequency in hyperthyroidism.

The treatment of the condition is well described. The value of digitalis and the methods of its administration are very clearly explained. The author's procedure is to give Nativelle's digitalin granules, and the effect of this treatment is recorded by charting the pulse rate and regularity.

The action of quinidine sulphate is discussed and described. It is pointed out that the difficulty in this therapy lies more in the selection of suitable cases than in the administration of the drug.

This small book should prove extremely useful to any physician who has to deal with these cases.

It is well printed and the charts and diagrams are numerous and useful.

POCKET CYCLOPEDIA OF MEDICINE AND SURGERY. GOULD AND PYLE.—Edited by R. J. E. Scott, M.A., B.C.L., M.D. 3rd edition. London: H. K. Lewis & Co., 1926. Pp. 922. Illustrated. Price, 12s. net.

THIS handy little book is very well got up and printed. It is of pocket size and is intended for the reader who wants immediate information, the subjects dealt with being arranged alphabetically, and frequent cross-references given. In general the book has been well edited and will be found very convenient by the general practitioner. Articles which are especially good are the one on coma and its causes, and the one on dietetics. The anatomical nomenclature adopted is that of the B.N.A. A useful table for reference is given from the International List of Causes of Death. The physician's dose table given as an appendix will be found very useful; both apothecaries' and metric doses are given, together with solubilities and incompatibilities. Tropical diseases are not too well dealt with, and in a future edition this should be remedied.

CHEMISTRY AND RECENT PROGRESS IN MEDICINE.—By Julius Stieglitz. Baltimore: The Williams and Wilkinson Co., 1926. Pp. xviii plus 62. Price, 7s. net.

THIS is a book of 62 pages embodying the second series of the *Charles E. Dohne Memorial Lectures* delivered in 1924 by Dr. Julius Stieglitz, Ph.D., Professor of Chemistry in the University of Chicago, under the terms of the Chair endowed in 1916 by Mrs. C. E. Dohne of Baltimore, in the Johns Hopkins University.

The subject-matter of the lectures is as interesting as it is useful. The purpose of the lectureship is to promote the development of a more intimate relationship between chemistry, pharmacy and medicine, and a perusal of the book will convince the reader that the labours of the author have not been spent in vain in clearly and forcefully establishing this relation. The contributions of chemistry to the progress of medicine, though recognised from very early times, have at no period in the history of medicine been of such paramount value as during the last 30 or 40 years, and it is hardly possible to overstate the importance of chemistry in medicine. The manufacture of numberless complex synthetic drugs in the laboratory of the chemist, the close study of their structure and the relationships which they bear to one another, the wonderful skill with which their composition can be altered in order either to deprive them of toxicity or to impart to them new curative virtues, and the improved methods for conducting pharmacological researches and for the study of the action of drugs on animals and man, are some of invaluable contributions made by the science of chemistry (inclusive of physical chemistry) to the development and progress of modern medicine. But the crowning glory of chemistry lies in the recent investigation into the composition and properties of hormones, the isolation of their active principles, and their successful application to the treatment of diseases hitherto considered intractable by the medical profession. Indeed it is no exaggeration to say that chemistry has played the most important part, not only in raising medicine from the quagmire of *empiricism* to the dignity of a *science*, but also in bringing it to its present high state of efficiency.

The learned author in his lectures has ably and carefully traced the history of this development in its successive stages and the book is replete with interesting facts and figures in support of his proposition.

We gladly recommend this book to every student of medicine.

J. P. B.

CHEMICAL PATHOLOGY.—By H. Gideon Wells, M.D., Ph.D. 5th edition. London and Philadelphia: W. W. Saunders, Company. Pp. 790. Price, 40s. net.

WE welcome the fifth edition of this book, because it has been a standard book of reference for many years past. So much new work has recently been done in biochemistry and so voluminous are the published results on the subject from workers all over the world that the author deserves great credit in being able to present a fairly complete résumé of all these valuable materials within a single volume of such moderate size. The author has done well in eliminating much of the older work from the present edition, because some of the theories have since changed and others are generally known to modern physicians and students. On the other hand the book has been entirely re-written in some parts to assimilate some of the essential modern developments and thus many of the sections appear to be entirely new. Four chapters have been devoted to the subject of the chemistry of immunity reactions and the subject-matter is ably dealt with. As in the former edition the chapter on diabetes has been largely contributed by Dr. R. T. Wood-Yatt and the latest developments have been included bringing the subject up-to-date.

The book is an excellent book of reference in biological chemistry and we have great pleasure in recommending the book as such.

J. P. B.

HANDBOOK ON GYNÆCOLOGY.—By S. K. Gupta, M.B. Calcutta: The Book Company, 1926. Pp. vi plus 114. Price, Rs. 2.

THE above is a very short book written by Dr. S. K. Gupta, for the purpose of providing a *vade mecum* of easy reference for the practitioner in the mofussil.

The author in his preface states that as a rule textbooks on gynæcology are so large that no one except a specialist consults them, and that the subject is so neglected in medical schools in India that a small book of this nature is required. The book will probably serve its purpose, and its price Rs. 2, should bring it within the reach of every country doctor.

We are however of opinion that the book is too condensed, for in many places the subject-matter merely consists of a series of headings and statements which may completely "fog" the country practitioner who is seeking for knowledge. Some of the differential diagnosis tables are quite good, and the section on operative gynæcology should also be a great help to those who are ignorant of the technique of small operations such as dilatation, and curetting, but we cannot agree with the author that Fothergill's combined operation for procidentia is a minor vaginal operation which may be lightly undertaken by the unskilled operator.

We suggest that in a future edition more attention be paid to the English, which is very poor throughout the book, and in some places is so bad as to render the author's meaning obscure.

H. E. M.

ADVICE TO THE EXPECTANT MOTHER ON THE CARE OF HER HEALTH.—By F. J. BROWNE, M.D., D.Sc., F.R.C.S.E. Edinburgh: E. & S. Livingstone, 1926. Pp. 40. Price, 6d.; postage (abroad) 2d.

THIS little paper-bound brochure will be found invaluable by health workers and by physicians to place in the hands of their patients. It is written by a leading authority, formerly assistant physician Edinburgh Royal Infirmary, now Director of the Obstetrical Unit at University College Hospital, London. The style is clear and concise, the instructions easily understandable, and the price is within the reach of the very poorest patient. Such a little book should be exceedingly helpful to all who have much to do with ante-natal work; and ante-natal work is needed more in India perhaps than in any other country in the world.

THE CATECHISM SERIES.—Edinburgh: E. & S. Livingstone, 16 & 17 Teviot Place. Price, 1s. 6d. net each part, plus postage.

WE have previously dealt with some volumes of this series, but a considerable number of further volumes has now come to hand. In general the series is well got up, well printed and of very convenient size. We have no doubt that these books will prove very attractive to medical students reading for their final examinations. The range of subjects covered is a very wide one; the authors are teachers in their own subjects; and many of the volumes are illustrated. The following is the latest list from Messrs. Livingstone's catalogue of the volumes included in the "Catechism Series," together with notes on some of them:—

Anatomy. Six parts. 3rd edition.
Bacteriology and Protozoology. Two parts. 3rd edition. By W. R. Logan, M.D., F.R.C.P.E. These two volumes cover a surprisingly wide range, and include questions on preventive medicine, disinfectants and antiseptics. The information is accurate and well condensed.

Botany. Two parts. 3rd edition.
Diseases of the Ear, Nose and Throat. By Gavin Young, M.C., M.B., Ch.B., F.R.F.P.S. In this book the section on rhinitis is particularly good, and we are glad

to note that the author lays stress on the general inefficiency of vaccine therapy; the operative procedures described are more satisfactory.

Diseases of the Eye. One part. By W. G. Sym, M.D., F.R.C.S.E. Here the author does well to keep the text clear, elementary, and eminently suitable for students. Thus the account of conjunctivitis is adequate, the differentiation of iritis from conjunctivitis is detailed, but operations for cataract are not discussed, as such a subject is rather beyond the average medical student's needs; he is taught however how to decide whether the eye is suitable or not for extraction.

Diseases of the Skin. One part.

Forensic Medicine. One part. 2nd edition.

Gynæcology. One part.

Histology. One part. 2nd edition.

Materia Medica. Three parts. 3rd edition. Revised according to the new British Pharmacopœia. Or, in one volume, 4s. 6d. net.

Medicine. Five parts. 2nd and 3rd editions. Or, in one cloth-bound volume, 7s. 6d. net.

Mental Diseases. The author's name is not given, but the little volume is an admirable one, not only for medical students, but also for the general practitioner. It avoids all psycho-analytical controversies; is simple and elementary in its teaching, but will be found most useful from the point of view of diagnosis, and of knowing what to do with mental patients. The (English) Mental Deficiency Act of 1913 is quoted for guidance, general lines of treatment for mental subjects are discussed, and a short note given on the future of mental hygiene.

Midwifery. Two parts. 3rd edition.

Operative Surgery. Three parts. 3rd edition. Or, in one volume, 4s. 6d.

Pathology. Five parts. 3rd edition. Or, in one volume, 7s. 6d.

Physiology. Four parts. 3rd and 4th editions.

Physics. Two parts. 3rd edition.

Public Health. Two parts. 3rd edition.

Surgery. Five parts. 4th edition. Or, in one volume, cloth-bound, 7s. 6d.

Surgical Anatomy. Three parts. 2nd edition. Or, in one volume, 4s. 6d.

Toxicology. One part. 2nd edition.

Veneral Diseases. One part. By C. Averill, M.A., M.D., D.P.H. Here the amount of clinical instruction given is excellent, but the dark ground method is only mentioned, and not described. The Wassermann and colloidal gold tests are briefly described, and their value discussed. The salvarsan compounds are discussed, but not bismuth treatment.

Zoology. Three parts. 2nd edition. Or, in one volume, 4s. 6d. net.

The books in italics are new editions and have been published within the last few months. It will be seen that a very complete library for medical students is provided by the "Catechism Series"; whilst the question-and-answer form of style is one especially suitable for memorising for examinations.

COLLECTED PAPERS BY THE STAFF OF THE HENRY FORD HOSPITAL.—(First Series, 1915—1925). New York: Paul B. Hoeber Inc., 1926. Pp. 665, with 151 illustrations and 42 charts. Price, \$8.00 net.

As far as we remember from his autobiography, the Henry Ford Hospital has an interesting history; in 1909 the citizens of Detroit, Michigan, commenced a campaign to provide the city with a hospital. It was not however until the great Henry Ford took a hand that the project matured, and in hospital matters this pioneer of industry shewed the same acumen that has characterised his whole business career. He endowed the hospital liberally and insisted that its staff should be well paid, but not permitted outside practice, and so give their whole time to their duties. The result of the first ten years of this policy is seen in this admirable—almost sumptuous—volume. The hospital buildings now cover more than 20 acres of ground in the centre

of Detroit, and include a large educational establishment and a splendid nurses' home.

The volume, which is well printed, fully illustrated, and well indexed, contains nearly 50 papers.

H. P. Doub, A. Bolliger, and F. W. Hartmann contribute an important study on the immediate metabolic disturbances following deep x-ray therapy. Interesting papers on obstetrics are reprinted, including two on the placental transmission of certain constituents of the blood by L. J. Bogert, E. D. Plass, and C. W. Matthew. F. J. Smith and R. D. McClure describe two cases of angina pectoris treated by cervical sympathectomy with substantial decrease in the frequency of the seizures, but in neither case was relief complete. E. C. Davidson contributes a very complete study of tannic acid in the treatment of burns. Tannic acid was used either in the form of compresses moistened with a 5 per cent. solution or as a 5 per cent. ointment with lanolin and vaseline. A study of 25 cases leads to the conclusion that tannic acid acts as an analgesic, that its use lessens toxæmia, that its astringent action decreases the loss of body fluid, and that secondary infection is markedly limited. On the medical side R. D. McClure deals with the treatment of pernicious anæmia by splenectomy and repeated blood transfusions, and R. H. Major describes the treatment of empyema by simple aspiration followed by the introduction of a solution of gentian violet into the thoracic cavity. An appendix contains notes on certain technical appliances, and a foreword by Dr. F. J. Sladen, physician-in-chief, is full of wise sayings on the subject of medical research.

Workers in every field of clinical medicine and research will find much of interest in this book. It is impossible to discuss the merits of the different articles in a short review, but those on blood transfusion, the tannic acid treatment of burns, and on duodenal ulcer appealed more particularly to the reviewer.

Annual Report.

LEAGUE OF NATIONS. ANNUAL REPORT OF THE HEALTH ORGANISATION FOR 1925. GENEVA, APRIL 1926.

THIS is a wonderful document, for it presents something which the world has not seen previously,—except perhaps under the auspices of the Rockefeller Foundation. There may be critics of the League of Nations, but there can scarcely be any of its Health Organisation. It is true that its activities in the Far East are still small, although it has established the new Epidemiological Bureau at Singapore to guard the public health of the maritime ports between Port Said, Capetown, Hongkong and Melbourne; but with regard to Europe at least its activities are enormous. Further, as one looks through the pages of the report one cannot but be struck by the long lists of distinguished names of the members of the different commissions concerned; there is here real international activity of the highest order; from enquiries into the cancer problem to investigations into the standardisation of sera and biological products it is the men of the very highest scientific status in different European countries who are here collaborating, with—as a corollary—results of the very greatest importance.

The report is divisible into several sections. An account is first given of the history and organisation of the health service of the League of Nations, and of the necessity which has arisen for a short, precise annual report in place of many different reports to present a review of the year's work. No less than 42 states are represented in the Health Organisation, and the Epidemic Commission—which is perhaps the most important of all the commissions established by the organisation—has been at work since 1920. Its duties are the organisation of quarantine stations, the equipment of hospitals, the application of measures for cleansing and disinfection,

the securing and distribution of supplies of food, clothing, soap, etc., during epidemic conditions, and the securing of accurate information with regard to epidemics. Up to 1923 its chief work was in Poland and Eastern Europe; also in connection with the tremendous influx of Greek refugees into Greece following the war in Asia Minor, when epidemic typhus, small-pox, cholera, and enteric fever had all to be faced. At present its activities are largely concerned with Russia, where even the most elementary facts with regard to the epidemic situation have still to be ascertained; and it is in Eastern Europe at present that the Commission's chief activities are centred. In 1925 an annual report was issued which outlined the epidemic conditions prevalent in 29 European, 20 American, 17 African and 16 Asiatic countries and in Australia; in brief the actual conditions with regard to over 60 per cent. of the world's population is thus collated and presented in precise form for the information of public health officials all over the world. Obviously such a step is the first measure towards international health control; it is a reconnaissance—and, if the personnel concerned be studied, it may be added a reconnaissance in force—with a view to outlining the general situation to be faced. Monthly reports are also issued, of which twelve were issued in 1925, and the information in them is mostly derived from telegraphic sources so as to be fully up to date. Further, more recently meteorological data have been added to these monthly reports, which will be of interest to all students of epidemiology. Previously there have been great delays in receiving information since such information usually came through the channels of consular offices; it is hoped to eliminate this and to establish direct telegraphic contact with the public health organisations of the different countries concerned.

The Mission to the Far East in 1922-23, which led to the foundation of the Singapore Bureau, has already been dealt with in our columns at different times, and need not here be reviewed.

A second commission is that for the study of causes of death. The personnel here is again a very strong one and representatives of registrar general's offices in many countries are on it. Here the attempt is being made to obtain a standard classification of causes of death; to obtain uniformity in the presentation of vital statistics by different countries; to define the meaning of the term still-birth so as to again secure uniformity in the method of presentation of statistics; and to obtain standardisation in the use of mortality and morbidity rates. It is suggested that two registers should be maintained with regard to births, a register of live-births—where the foetus has been separated from the mother and has breathed; and a register of dead-births, each entry in which should be attested by a certificate from a medical officer stating the cause of death. If widespread information can be collected on the second point much information of value will obviously come to light. Throughout the work of this commission one sees everywhere the attempt to obtain international standardisation so that returns from different countries may be comparable. The results already achieved from special and subordinate enquiries in this connection are already of great importance. Thus with regard to epidemic cerebro-spinal meningitis it is evident that the meningococcus is the chief—if not the only—factor concerned; that trauma and otitis are important contributing factors, and that the serum treatment in general scarcely appears to affect the mortality rate. Dr. S. Rosenfeld of Vienna, whose name will be familiar to all pathologists, presents a special report on tuberculosis statistics; at present no uniform method of presenting such statistics prevails and if information is to be of value when collated, some uniformity of method of presentation of the figures must be evolved. Dr. E. Roesle of Berlin presents a report on scarlet fever in different countries; collected data on the incidence and virulence of this disease in different countries are now very considerable; and the remarkable differences in virulence of the disease in different countries, also its remarkable variations in virulence in epidemics occurring at different periods in the same country demand investi-

gation. With regard to cholera Major A. J. H. Russell, I.M.S., Director of Public Health, Madras, presents a special report concerning India, the substance of which has previously been reviewed in our columns. In Russia, Professor Barikine and Dr. Cazeneuve review the position in the riverine areas of the Don and Temernik rivers. This focus appears to be endemic in Europe, but not to constitute a source of danger. Three types of vibrio are recognised to be present; the true cholera vibrio of Koch, the choleraform vibrio and the phosphorescent vibrio. They appear to be closely allied and it also seems as if contacts with the disease may acquire a certain amount of immunity after infection with vibrios of low grade virulence. But cholera, concludes the report, is a problem of such world-wide importance that—when men and funds permit—it must be tackled at its source in India and the Far East.

Of other general activities of the epidemiological section of the organisation one may mention the publication of an "International Health Book" in 1925 containing reports on public health progress in 22 different countries during 1924; the publication of handbooks on vital statistics giving methods for the collection of such data and the criteria to be applied in examining them, and reviews—written in a uniform pattern—of public health activities in different countries.

Turning to the various commissions dealing with special diseases, the work of the Malaria Commission comes first. This was founded in 1923, and in 1924 it conducted special surveys in Serbia, Czecho-Slovakia, Greece, Roumania, Bulgaria, Russia and Italy. In 1925 its chief activities were in Palestine and Syria. In general, it is reported, two chief views prevail as to the best method of malarial control; one school of thought advocates anti-mosquito measures especially, the other the attempt to eradicate the gametocyte-harboursing reservoir of infection by thorough cinchonisation of all malarial subjects in the area. In urban areas it is not difficult to establish mosquito control, but the same cannot be said of the wide countryside. Rice fields and the migration of labourers are further elements in the malarial problem. In general the chief task of the Commission is to draft a general report on the question of malaria in Europe. Teaching in malariology in Europe has been found to be defective, and special classes and courses of study have been arranged. The much vexed question of the different alkaloids of cinchona bark is to be investigated by large scale experiments in certain hospitals in the countries of Southern Europe. Further, Albania has asked for a special malarial commission; Corsica has now acquired an unenviable reputation as a malarial focus, and its economic position is seriously affected by the disease; whilst in Macedonia what is called for is not further investigations but the steady application of anti-malarial measures to a situation which has already been studied. Finally, the first international malaria congress was held at Rome in October 1925. In one of its resolutions the Congress resolved that "considering the efforts already made by the Health Committee of the League of Nations, the Congress expresses the hope that close co-operation will be established between chemists, pharmacologists and clinical experts with a view to methodical experiments on all chemical bodies which may prove effective against malaria."

The work of the Permanent Standardisation Committee is fully reported on. Here there are world-wide problems of importance to be faced. With regard to anti-diphtheritic serum uniformity has already been secured. The new American standard has been shewn to be the same as the old Frankfort standard laid down by Ehrlich, and has now been accepted as the uniform standard for international use. The Danish State Sero-therapeutic Institute is now prepared to test the anti-diphtheritic sera in use in different countries against the established standard of the Permanent Standardisation Committee; and it is suggested that 1,000 units shall be used as the prophylactic dose, and 10,000 anti-toxin units the therapeutic dose. The standardisation of anti-dysenteric serum (against Shiga's bacillus) has also

been studied, and Professor Madsen of Copenhagen is now engaged in working out a suitable method of standardisation. The strength of anti-tetanic sera varies widely in different countries and here unanimity has so far not been reached. The Committee are studying this problem, as also the question of standardisation of anti-anthrax serum. With regard to other antisera our knowledge is at present insufficient for methods of standardisation to be introduced.

The standardisation of certain drugs which cannot be standard by chemical assay is a matter of even greater importance; and here a conference was held under the chairmanship of Dr. H. H. Dale at the National Institute for Medical Research, Hampstead, in 1923; attended by many of the most distinguished pharmacologists in the world—(we may instance Professor MacLeod from Canada, and Dr. Voegtlin from Washington). A second similar conference was held at Geneva in 1925. Methods of standardisation have been put forward for adrenalin, *Felix mas*, pituitary extract, insulin—the international standard here being a dried preparation of insulin hydrochloride, 1 mgm. of which shall contain 8 units of insulin as defined by the Insulin Committee of Toronto,—digitalis—the standard for which is to be entrusted to Professor Magnus of Utrecht,—the arsenobenzol compounds—standards for which are to be entrusted to Professor Kolle of Frankfort and Dr. Voegtlin; also for parathyroid and ovarian extracts. Other drugs such as ergot, chenopodium and the vitamins require further study. Thyroid extract (desiccated) should contain 0.2 per cent. of iodine. Finally, the Committee passed a resolution in favour of a campaign for the international control of secret and proprietary remedies. Further, the question of an international pharmacopoeia is in sight.

A further activity of the same committee is the question of the standardisation of the serological tests for syphilis; at present a difficult and confused problem. This was first considered at the Second International Conference on Standardisation held in Paris in 1922. Later an international questionnaire was sent out; and still later the replies received from 19 different countries were considered. The Committee advocate in general (a) that facilities for serological examination shall be provided free of charge; (b) that only experts with full knowledge of technique shall be entrusted with the tests, the "W. R." of the small and inefficient laboratory being done away with; (c) that a uniform international system of notation should be introduced in order to make results comparable. This special problem is now under expert investigation in many different countries. It would be unwise to hurry the issue; but in the future it is to be hoped that unanimity and uniformity will be secured.

A special commission of the Health Organisation has been studying the problems of sleeping sickness and tuberculosis in Equatorial Africa. (And anyone who has followed the literature of recent years knows how awful these problems are.) The difficulty with regard to the campaign against sleeping sickness is the want of co-ordination—a matter to which Professor Duke has recently drawn attention in a striking address. In April 1925 a report was presented to the Health Committee by Drs. A. Balfour, E. van Camphenout, G. Martin and A. G. Bagshawe; a galaxy of names of brilliant workers which gives some measure of the gravity of the problems concerned. British, French, Italian, Portuguese, Belgian, and even Spanish possessions are concerned; hitherto each have run their own campaign; indeed—as pointed out by Duke—even the British spheres in Africa tend each to work on their own, with no co-ordination of staffs and no common and coherent policy. The result is that—despite our very complete knowledge of the mode of spread of sleeping sickness and of how to control it—the tsetse continues more and more to dominate man and beast, and the struggle of man *versus* insect is resulting in the victory of the latter. There are parts of Africa to-day where there were once good roads and motor transport, but which are to-day lying waste, where there are no oxen even, where the only transport available is the coolie, where jungle has

re-invaded what was once a human settlement, and motor roads have given place to jungle paths.

In May 1925 an international conference to consider this problem was held at the Colonial Office in London, when delegates from the six countries concerned attended. The conference recommended the establishment of international relationship between the medical officers of the different colonies concerned, and—above all—the establishment of an international commission to study and report upon the measures necessary for the control of sleeping sickness in Equatorial Africa. Lastly, it was suggested that a common international fund should be organised. As a result this commission has now been established. Its members are Dr. Duke, Dr. Lavier of Paris, Dr. van Hoof of Leopoldville in the Congo, Dr. Prates of Mozambique, and Professor Kleine of Berlin. These experts met at Entebbe at the beginning of February 1926. They follow upon the trail blazed by a dozen or so previous commissions,—commissions which included many of the men most famous in tropical medicine; and it is certain that their labours will be fruitful. The very existence of this commission is a striking instance of the solidarity which public health matters have attained in international politics. Here there is but one common objective; to save vast tracts of Equatorial Africa from the tsetse, and man from one of the worst scourges of the tropics.

With regard to the tuberculosis problem in the tropics, which is scarcely mentioned in the report, other reports from the Health Organisation of the League shew that it is chiefly the French workers in Northern Africa who have taken up the study of this problem with special interest. The sum of their reports is what one might have expected; that tuberculosis—introduced into a non-immunised indigenous population brought into contact with European civilisation during the past century and a half—is becoming one of the most terrible problems of French colonisation in Northern Africa.

The Opium Commission of the League has received much attention from the newspapers in India as in other countries. Their chief report is to the effect that a total amount of 450 mgms. of raw opium, with a morphine content of 10 per cent., should be the maximum permitted per head per annum for any country. Examination of the actual consumption (in European countries, only, we suppose, though this is not stated in the report) places the actual average consumption per head of the population at 400 mgms. per head per annum, but this does not include codeine or similar alkaloids. Further, there are alkaloids with a far more pernicious effect than morphine,—Professor Knaffl-Lenz in a special report instances eukodal and dicodid. Different countries, upon request, have drawn up schedules of products which they consider should be exempted from international control. The whole question is still, we understand from the report, at issue.

It is likely that the usual policy will be followed; that India's export of opium will be further restricted—with the automatic results that China and Japan will grow more opium and increase their revenues thereby. (The whole opium question is one which any medical worker of experience in India can scarcely be expected to view from the standpoint of a European. The bulk of evidence in India goes to show that, whilst opium is open to abuse, its abuse in India is a far less serious question than the abuse of cocaine or the importation in enormous quantities of heroin from America and other sources. The "opium evil" in India indeed is of insignificance when compared with the evils due to alcohol and to adulterated country liquors in this country.)

The Cancer Commission at present at least has a limited objective. The official statistics shew that there is considerable difference in the mortality from cancer of the breast and of the uterus in Great Britain, Holland and Italy. The result of statistical investigations shews that the incidence of cancer of the breast is highest among unmarried women and that of cancer of the uterus among married women; further there are marked geographical differences, even within the same country. On an average, surgical treatment of cancer of

the breast prolongs the patient's life by from three to ten years. In Holland the mortality from cancer amongst women is very much lower than in Great Britain, but no definite reasons can be given for this; in both countries, as well as in Italy, it would appear that only about one-third of the cases are operated upon.

The Tuberculosis Commission reports that, despite the fact that tuberculosis is better diagnosed to-day than in former decades and more frankly reported, yet there has been a steady decline in most European countries. Laboratory studies shew that the tubercle bacillus has not changed in virulence during the past 35 years, and the decline in tuberculosis cannot therefore be attributed to this cause. Improvement in general conditions of life and segregation of the sick are the two great factors which appear to have reduced the incidence of tuberculosis. The Commission's programme for investigation is a very wide one; the comparative death rates from tuberculosis and all other causes are to be studied in different countries; the relationship of quality of milk to infantile mortality, the influence of different grades of food, of industrial occupations and of alcohol on the tuberculosis mortality all deserve investigation.

Chapter IV of the report deals with the interchanges of public health personnel. This system was initiated in 1922 under the endowment from the Rockefeller Foundation, and many "study tours" have been carried out. The principle of these study tours is that public health officials from different countries shall meet together in a general conference at which their problems are considered, and shall then tour certain countries to see how such problems are there dealt with; the tour ending with a second conference, generally at Geneva. Further, special interchanges for specialist health officers concerned with special public health problems have been carried out. Chapter V of the report deals with special studies and investigations; and here the problem of the best and readiest means of disinfection of infected houses is being considered; also the problems of transmission of leishmaniasis in the Mediterranean basin. In Chapter VI future proposals made by different countries for new studies, activities and investigations are outlined.

This brief review of this very important report perhaps serves to shew how very widespread are the public health activities of the League of Nations. International public health organisation is not a merely visionary dream; in Europe it is a fact. As the activities of the Health Organisation of the League expand, both Africa and Asia will come more and more into its orbit, and what is to-day a relatively small organisation—but one in touch with very distinguished research workers in every country in Europe,—may one day be one with branches over the entire world. The reviewer especially welcomes the publication of this annual report. Hitherto the publications of the Health Organisation of the League of Nations have been extremely numerous and devoted to ever so many different aspects of its activities; it has been difficult to see the wood on account of the trees. The present report sums up and presents in precis form a clear account of its main activities.

R. K.

Correspondence.

QUININE-UREA IN MALARIA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I must thank you for your note to my query in the August issue of the *Gazette*, regarding the choice of quinine salts for injection in malaria; but with regard to your remark that "one would not care to advocate a greater dosage by injection than 10 grains (of quinine-urea) however," I desire to draw your attention to its possible use in malaria.

In America it has been used intravenously with reported success in hydrophobia (*Journal of the American*

Medical Association, 1913, Vol. II, p. 1511) in doses of 15 grains in 3 c.c. of saline, repeated at intervals of two hours for three injections, a total of 90 grains being given in all in six doses in 24 hours. This has prompted me to enquire whether quinine-urea might not with advantage be used subcutaneously in malaria in certain special cases.

I have been in a predicament in a case of pernicious malaria in a child with very small veins, and in the case of a young female, where intravenous and intramuscular injection is impossible, and it is in such cases that I look round for a preparation of quinine that is painless and unirritating, and that will not lead to destruction of tissue,—which conditions appear to be possessed by quinine-urea. If it can be given with safety in hydrophobia in the doses quoted, why cannot it be given in malaria? Has it a special selective sedative effect on the nervous system in this acute spasmodic affection?—Yours, etc.,

J. E. LEONARD CHINAL, M.D., D.T.M.
(Bengal).

MONGHYR,

E. I. Ry.

14th August 1926.

[NOTE.—We have referred Dr. Chinal's letter to Major R. N. Chopra, I.M.S., Professor of Pharmacology, Calcutta School of Tropical Medicine, who remarks that quinine-urea hydrochloride can be given subcutaneously, but that it is liable to produce necrosis of the tissues. Its quinine content is 59 per cent. as against a quinine content of 82 per cent. in quinine hydrochloride. It is much less irritant than the ordinary quinine salts, but concentrations of over one-quarter per cent. sometimes produce local irritation, œdema and later fibrous induration, whilst solutions over 1 per cent. in strength may produce sloughing. It forms a strongly acid solution and cannot be recommended for subcutaneous injections, except perhaps in special cases such as those mentioned by Dr. Chinal. In hydrophobia the use of any remedy which may be of value in heroic doses is legitimate, but one can hardly apply that to the treatment of severe cases of malaria.—EDITOR, I. M. G.]

COTTON SEED ASTHMA.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I shall be much obliged if readers of your journal will suggest the best lines of treatment for the following case:—

A Hindu male, aged 36 years, shopkeeper by profession, has been the subject of asthmatic fits since he was 9 years of age. The attack is brought on by the inhalation of cotton seeds, and is relieved by injections of liquor adrenalin. When the attack is about to come on there is a prodromal stage with peculiar sensory feelings. The patient is convinced that the attacks are due to inhalation of cotton seeds,—termed banolas in this locality.—Yours, etc.,

MATLOOB KHAN, Jemadar, I.M.D.
Sub-Assistant Surgeon.

BARSAR DISPENSARY,
KANGRA DISTRICT.

[NOTE.—Cotton seeds appear to be quite a prevalent cause of asthma in India. Our correspondent will find the subject specially dealt with in a paper by G. Raghunatha Rao, I.M.S., on p. 287 of our issue for June 1926.—EDITOR, I. M. G.]

THE TREATMENT OF LEUCODERMA.

WE have received so many letters from correspondents, enquiring as to the treatment for leucoderma adopted in Major H. W. Acton's skin out-patient clinic at the Calcutta School of Tropical Medicine, that we have asked Major Acton kindly to give us a suitable general reply to such correspondents.

Essentially, the condition is not due to loss of activity on the part of the melanoblasts of the skin, but to their

being provided with an insufficient supply of the correct amino-acids from the gut, from which melanin is ultimately evolved. The first thing to do in treatment is to enquire into the intestinal history of the patient. The stools should especially be examined for the cysts of *Entamoeba histolytica*, since infection with this parasite is often present. If it be found a course of six injections, one a day, each of 1 grain of emetine hydrochloride should be given intramuscularly; then two days rest; then three further emetine injections. During the course of emetine treatment, bismuth carbonate should be given in large doses, 1 drachm suspended in water or milk every four hours.

After this treatment, Mist. hydrarg. perchloridi; one oz. twice a day may be given.

Locally the oil of *bouchi* should be applied; (it can be obtained from Messrs. Smith, Stanistreet and Co., Ltd., Calcutta; and is stocked by most chemists in India).

With regard to diet, not too much milk should be taken, and the protein content of the diet should be raised; e.g., meat—in the case of meat-eating castes; or gram, *dāl* and peas in the case of vegetarians.

Such a line of treatment is often very successful in cases seen at a fairly early stage.—EDITOR, I. M. G.

THE MEDICAL REGISTER, BENGAL.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I am directed to forward for favour of publication in your journal the following notification in regard to the removal of the name of Dr. Dulalchand Nandi, I.M.S., from the Register of registered practitioners maintained under the Bengal Medical Act, 1914.

"Dr. Dulalchand Nandi, I.M.S. (Register No. 711) of 9, Hyat Khan Lane, Calcutta, has been found by the Bengal Council of Medical Registration guilty of infamous conduct in a professional respect and his name has been removed from the register of registered practitioners, maintained under the Bengal Medical Act, 1914."—Yours, etc.,

R. M. DAS,
Registrar, Bengal Council of
Medical Registration.

CALCUTTA,
7th September 1926.

THE OPERATIVE TREATMENT OF FRACTURES.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I have no desire to enter into a controversy as to the merits or demerits of the operative treatment of fractures. Surgical opinion has long since crystallised out. Colonel Hallilay would find few, if any, surgeons to support him in his thesis that the majority of fractures should be plated. Certainly not among surgeons who had specially studied the treatment of fractures.

I desire however to protest strongly against the tone of the article. Not content with ridiculing the present accepted methods of treating fractures, he goes on to accuse other surgeons of malpraxis, when they follow perfectly orthodox lines of treatment. If the case referred to as "rescued" is the case I think it is, I can only say that his disability lasted at least twice as long as the average for similar cases treated on lines described by Colonel Hallilay as malpraxis.

I congratulate Colonel Hallilay on his surgical technique, by which he has obtained such results, but I fear I cannot congratulate him on his surgical judgment.

To plate fractures of the lower end of the humerus involving the elbow joint, in children aged 11, 6 and 11 respectively, and to leave the plates on the growing end of the bone is to ensure deformity, and to disregard Arbuthnot Lane's own teaching.

In the preface to the last edition of Scudder's *Fractures*, among the improvements and advances in the treatment of fractures, he enumerates "The revolt against the general use of metallic sutures and plates."

A fairly recent Committee of the Association of American Surgeons found that although the percentage of anatomical recoveries was higher in the operated on cases, the percentage of functional recoveries was higher in the non-operated on cases.

So far as India is concerned we may leave it at that. Very few Indian hospitals are staffed and equipped to undertake the plating of fractures even if it were recognised as the best treatment in other parts of the world.

May I suggest to Colonel Hallilay that articles, based on his experience, as to the best anatomical line of approach to expose fractures, where operation is indicated, would be more appreciated than ridicule of the accepted methods, and accusations of "malpraxis" which have no justification except in his own imagination. I may add that I was in no way interested in the treatment of the "rescued" medical officer.—Yours, etc.

A. H. PROCTOR,
Lieut.-Colonel, I. M. S.

PRESIDENCY GENERAL HOSPITAL,
CALCUTTA, the 24th September 1926.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Major R. B. Seymour Sewell, I.M.S., is confirmed in his appointment as Director, Zoological Survey of India with effect from the 27th July 1926.

The services of Major N. D. Puri, I.M.S., are placed permanently at the disposal of the Government of the Punjab with effect from the 29th January 1924 for employment in the Jail Department.

The services of Major G. Covell, M.D., I.M.S. Officiating Assistant Director, Central Research Institute, Kasauli, are placed temporarily at the disposal of the Chief Commissioner, Andaman and Nicobar Islands, with effect from the afternoon of the 26th July 1926.

The services of the undermentioned Indian Medical Service Officers are placed permanently at the disposal of the Government of Bombay with effect from the dates shown against their names:—

Major S. S. Vazifdar, 24th January 1926.

Major C. M. Plumptre, 19th April 1926.

Major R. H. Candy, M.B., 18th March 1926.

Captain B. Z. Shah, 21st May 1926.

The undermentioned officers are appointed temporarily to the Medical Research Department and posted as supernumerary Officers at the Institutes mentioned against their names with effect from the dates on which they assume charge of their duties.

(1) Captain S. D. S. Greval, M.D., I.M.S., Central Research Institute, Kasauli.

(2) Captain W. J. Webster, M.C., M.B., I.M.S., King Institute of Preventive Medicine, Guindy.

(3) Captain E. Kean, M.B., I.M.S., Haffkine Institute, Parel.

LEAVE.

Major R. Sweet, D.S.O., M.B., I.M.S., Officer-in-charge, Medical Store Depot, Lahore Cantonment, is granted 30 days' privilege leave with effect from the 18th August 1926.

Major E. S. Goss, M.C., I.M.S., Officer-in-charge, Medical Store Depot, Madras, is granted 2 months' privilege leave combined with 6 months' furlough *ex-India*, with effect from the 10th August 1926, forenoon.

PROMOTIONS.

Majors to be Lieutenant-Colonels.

Broderick Edward Middleton Newland. Dated 1st March 1925.

(Army Department Notification No. 1253, dated the 11th September 1925, in so far as it relates to Lieutenant-Colonel B. E. M. Newland, is hereby cancelled).

Owen Alfred Rowland Berkeley Hill, M.D. Dated 2nd August 1926.

Walter Lidwell Harnett, M.B., F.R.C.S. Dated 2nd August 1926.

John Drummond Sandes, M.D. Dated 2nd August 1926.

Alexander Harper Napier, M.D. Dated 2nd August 1926.

Gilbert Holroyd, M.D. Dated 2nd August 1926.

David Livingstone Graham, O.B.E., M.B., F.R.C.S.E. Dated 2nd August 1926.

Edmund Brodie Munro, O.B.E., M.B. Dated 2nd August 1926.

John Alfred Steele Phillips. Dated 2nd August 1926.

Patrick Manson Rennie, M.B. Dated 2nd August 1926.

Harold Munde Inman. Dated 2nd August 1926.

Captains to be Majors.

John Barree de Winton Molony, O.B.E., M.B., F.R.C.S.E. Dated 6th August 1926.

Harold George Alexander, F.R.C.S. Dated 6th August 1926.

Bawa Harkishan Singh, M.C. Dated 6th August 1926.

Pindi Das Chopra, M.B. Dated 6th August 1926.

Arthur Henry Harty. Dated 7th August 1926.

George Shanks, M.D. Dated 12th August 1926.

Robert Lancelot Vance. Dated 15th August 1926.

Captain (now Major) F. J. Anderson, M.C., M.B., I.M.S., is granted the acting rank of Major from 1st May 1918 to 6th February 1921 and from 7th March 1921 to 16th May 1921 whilst serving with the Egyptian Expeditionary Force.

Lieutenant to be Captain.

William Lawie, M.B. Dated 28th October 1925.

Temporary Lieutenants to be temporary Captains.

Girdhari Lal Puri. Dated 20th August 1926.

Daya Ram Malhotra. Dated 21st August 1926.

RETIREMENTS.

Lieutenant-Colonel W. S. J. Shaw, M.B., 16th August 1926.

Lieutenant-Colonel E. C. G. Maddock, C.I.E., 2nd August 1926.

Lieutenant-Colonel A. W. Tuke, F.R.C.S.I., 27th July 1926.

Lieutenant-Colonel A. J. V. Betts, 27th July 1926.

Lieutenant-Colonel H. R. Brown, 29th July 1926.

RESIGNATIONS.

Captain Sarat Chandra Basu. Dated 1st September 1926.

Captain Pearcey Lall Whig. Dated 1st September 1926.

NOTES.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.

(Division of Tropical Medicine and Hygiene.)

EXAMINATION RESULT. 80TH SESSION. MARCH—JULY 1926.

Passed with Distinction:—

R. Crawford—Winner of "Duncan" and "Lalcaca" Medals.

R. M. Morris—Winner of "Lalcaca" Medal.

E. G. Sayers.

J. C. Paisley.

I. G. MacGregor.

W. Thomson.

R. W. Thomas.

T. C. Wakefield.

R. B. Jackson.

K. A. MacKay.

J. A. W. Ebdon.

A. F. Babonau.

E. Le Clezio.

Nov., 1926.]

Passed:—

D. S. Adkins.
E. M. Clow.
B. G. Wheatley.
H. M. O. Lester.
A. Schourenkoff.
P. Milne.
C. L. Digby Roberts.
B. E. Ebdon.
W. S. Urquhart.
M. K. Murray.
V. A. Stookes.
C. C. Taffs.
I. Magdi.
I. T. Kunaratnam.
G. Sanders.
G. C. Bergman.
A. J. Boase.
J. McNabb.
V. J. G. MacGregor.

W. Yuen.
M. D. Macqueen.
W. D. Pollard.
D. I. Gracey.
H. J. F. Wood.
J. E. Chow.
M. Din.
A. J. Lee.
G. W. Mearns.
J. E. Howard.
J. H. McDonald.
A. M. K. O'Halloran.
D. D. N. Selvadurai.
A. Brooks.
J. Symington.
B. Merrin.
C. Kearney.
N. G. Rodriguez.
B. Chiostrì.

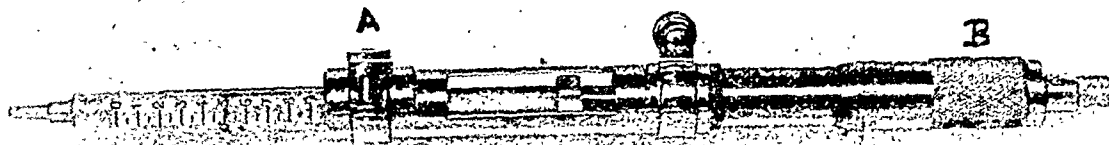
27th July 1926.

The whole arrangement of the exhibit was distinctly novel and interesting and as usual the style in which every detail was carried out was characteristic of a firm which uses meticulous care in everything it does.

THE 'AGLA' MICROMETER SYRINGE APPARATUS.

THE accurate instrument for the measurement of extremely minute quantities of liquids, described by Dr. J. W. Trevan in *The Biochemical Journal*, Vol. XIX, No. 6, p. 1111, is now obtainable from Burroughs, Wellcome & Co. It is known as the 'Agla' Micrometer Syringe Apparatus and is suitable for the measurement of volumes from 0.5 c.c. (with an error of less than ± 0.1 per cent.) to those as small as 0.001 c.c. (with an error of less than 5 per cent.). In immunological work the instrument can measure volumes of the order of 0.01 c.c. with an error of less than ± 1 per cent.

In the illustration the instrument is shown assembled for use. The syringe is firmly clamped at (A) and



BRITISH MEDICAL ASSOCIATION MEETING, NOTTINGHAM, JULY 19-23, 1926.

Notes on Burroughs, Wellcome & Co.'s Exhibit.

A NOVEL, and interesting feature was utilised by Burroughs, Wellcome & Co. to present to the medical visitor an index of some of the most modern scientific materials available for the treatment of diseases.

A life-sized female figure illuminated by transmitted light showed the principal organs of the body in a diagrammatic manner and in distinctive colours. Alongside the figure was a key giving the colours, the organs, and a list of selected products for the treatment of conditions associated with the different organs. The panels on the exhibit itself were coloured and lettered to correspond to the organs and in these panels appropriate products were displayed.

For example the heart was shown on the figure in carmine and its panel was lettered and bordered in the same colour. On the panel itself were exhibited 'Tabloid' Digitalis Leaf gr. =1 and gr. = $\frac{1}{2}$. 'Wellcome' Tincture of Digitalis, (physiologically standardised) in regard to which products Burroughs, Wellcome & Co. are most favourably placed by reason of their cultivation of digitalis on the 'Wellcome' Materia Medica Farm. Strophanthus, the first supplies of which were obtained by Burroughs, Wellcome & Co., was also shown, as well as 'Tabloid' Sodium Nitrite Compound for use in hypertension.

Some of the other panels were devoted to the following:—

Pancreas, in connection with which 'Wellcome' Insulin and 'Tabloid' Hypodermic Insulin Hydrochloride and 'Soloid' Benedict test for sugar were featured.

Throat.—Displays of Schick and Dick Test products and of 'Wellcome' Brand Diphtheria Antitoxin and Scarlet Fever Antitoxin.

Thyroid Gland.—'Tabloid' Thyroid Gland and 'Tabloid' Parathyroid with microscopic section indicating the difference in structure.

In the panel devoted to specific diseases the causative organisms in syphilis, gonorrhoea, leprosy and influenza were shown, together with 'Neokharsivan,' 'Hypoloid' Bismuth Metal, 'Nizin,' 'Wellcome' Anti-gonococcus Serum, 'Moogrol,' 'Wellcome' Influenza Vaccine and other Burroughs, Wellcome & Co.'s products, use in combating these diseases.

should be so arranged that it is not quite empty when the micrometer is screwed down to the zero mark. Supplied with the apparatus is a syringe of such a size that a 0.5 m.m. movement of the piston (one turn of the micrometer head B) will eject 0.01 c.c. The syringe is filled by unscrewing the micrometer head and drawing up fluid by moving the piston by hand. If the filled instrument is allowed to stand for any considerable length of time, evaporation will cause the liquid to retreat slightly from the end of the needle so that, after standing, the first 0.01 c.c. should be rejected.

The 'Agla' Micrometer Syringe Apparatus enables a fine degree of accuracy to be attained in various delicate laboratory processes including the following:—

1. Immunological titrations with very small quantities of serum.

2. The calibration of pipettes of small volume. For this purpose an ordinary fine hypodermic needle should be used and the required volume injected into the pipette by inserting the needle just inside the end of the capillary.

3. Micro-chemical titrations and micro-gas analyses, in which the instrument may be used as a burette.

Price in London—55s. complete net.

Further details may be obtained from Burroughs, Wellcome & Co.

"SAFETY FIRST" IN PHOTOGRAPHY.

"SAFETY FIRST" is the appropriate title of an attractive book on photographic matters. The booklet is issued by Burroughs, Wellcome & Co., and the title is appropriate because it contrasts the risky rule of thumb methods of the past with the scientifically safe methods of to-day.

An illustration vividly reminds us that in the early days photography as a hobby was hampered by bulky chemicals and cumbersome apparatus, the old-time landscape photographer, burdened with his impedimenta, having the appearance of a pedlar. Many of the operations were haphazard in character; exposure was a matter of guess-work, and development a constant struggle to correct errors in exposure.

To-day, however, photography can be cleanly, accurate, and devoid of disappointment. To achieve these desirable results it is necessary to adopt the motto of "Safety

First," and in the booklet under review the various steps in photography are all dealt with in the light of this motto. The working of the 'Wellcome' Photographic Exposure Calculator is explained, and there are pages of up-to-date information on the diverse characteristics of the many kinds of films and plates in current use. In particular, the new technique of desensitising, by means of which the inconveniences of the dark room are reduced to a minimum, is well worthy of the amateur's attention. The booklet contains in addition a selection of pleasing illustrations in colour, which are actual reproductions of photographs developed and toned with 'Tabloid' Photographic Chemicals which have contributed in no small degree to "Safety First" in photography.

This interesting booklet will be sent post free to any reader mentioning this paper and applying to Burroughs, Wellcome & Co., Post Box No. 290, Bombay.

THE SUPPLY OF SANTONIN.

REPORTS of recent years have suggested that, owing to disturbed political conditions in Turkestan and adjacent countries, the world supply of santonin has fallen off, whilst the price of the drug has risen. We have been requested by the Tchimkent State Santonin Works, Turkestan, U. S. S. R., to state that this is now not the case, and that full supplies of santonin are available. It should be possible to procure the drug from both wholesale and retail firms in India. It is put up in packages of $\frac{1}{4}$ th oz. each, and we have been asked to publish a facsimile of the original label on such packages in order that those who indent for this drug may know that they are receiving the genuine Turkestan—and

with the subcutaneous route than any other preparation tested. Reports by several German workers testify to its value in cases of cardiac insufficiency, arrhythmia, and circulatory disturbances. Brugsch in the *Deutsche Med. Wochenschrift* for 1920 speaks of its rapid absorption from the gut and of its immediate action, whilst other reports commend its diuretic action. It is put up in the form of tablets, each of 1/75th grain, for oral administration; also of ampoules of the same strength for hypodermic administration. The Indian agents are Messrs. C. Gresham and Co., P. O. Box No. 492, Calcutta.

BISMUTH INJECTIONS IN SYPHILIS.

THE position of bismuth in the treatment of syphilis is still a little obscure. To be efficacious it has to be administered by the hypodermic or intramuscular route, whilst its action on the spirochæte of syphilis appears to depend upon its being present in the infected tissues in a colloidal state. It is possibly not quite equal to the organical derivatives of arsenic for visceral and dermal syphilis, but does not fall far short of their spirochætidal power, and is of special value in neuro-syphilis of all forms.

An interesting product in this connection is the "Iodo-bismuthate of quinine," prepared by the Fraisse Laboratories, 8 Rue Jamin, Paris (16c). This supplies a triple action of iodine, bismuth and quinine; it is claimed that it is absolutely non-irritant on intramuscular injection, that its absorption is slow and steady, that its effects are "at least as rapid and at least as great as those of any other salt of bismuth." The drug is put up in ampoules of 0.20 gm. dissolved in 4 c.c. of oil, and of 0.30 gm. dissolved in 3 c.c. of oil. The course of treatment advocated is a total course of 5 to 6 grammes of the drug distributed over injections every third day. It is claimed that it has a special value for syphilitic lesions of the mucous membranes, and that it is excreted by the mouth as well as by the urine and other secretions.

The same firm also prepare "Ferruginous ampoules," which contain the cacodylates of iron and strychnine with sodium glycerophosphate; and "Neurosthenic ampoules" which contain cacodylate of strychnine and sodium glycerophosphate. For these preparations it is claimed that they provide an assured therapeutic and tonic action, and that the cacodylates concerned are non-irritant to the kidneys and are especially suitable for hypodermic use.

TCHIMKENT STATE SANTONIN WORKS, TURKESTAN, U.S.S.R.	EXCLUSIVE OFFICIAL DISTRIBUTORS THE EASTERN & RUSSIAN TRADING CO. LTD. 26, FINSBURY SQ., LONDON, E.C.2.
<div style="text-align: center;">  <p>SANTONINUM PUR. ALB. RECRYST.</p> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> CABLES: ERTCOSANTO, LONDON. </div>	

efficient—santonin. Messrs. Turnbull Brothers, Ltd., 1 and 2, Hare Street, Calcutta, P. O. Box No. 269, have recently been appointed as the sole agents for India for the Eastern and Russian Trading Co., Ltd., and will be glad to supply information on request.

The use of santonin has been reduced in recent years in Indian hospitals owing to the difficulty in procuring the drug and its price. These difficulties have now been overcome.

"VERODIGEN," BOEHRINGER AND SOEHNE.

BOEHRINGER and SOEHNE's preparations have long been known to physicians as reliable and as subjected to the most severe tests before they are issued, whilst they have made a special study of climatic conditions as they affect the keeping properties of drugs in the tropics. In the *Archives für Experimentelle Pathologie und Pharmacologie*, Vol. 109, No. 4, pp. 35-59, Dr. Lendle of the Pharmacological Institute, Kiel, reports very favourably upon their preparation "Verodigen." "The water-soluble glucoside extract of . . . is administered either hypodermically, intravenously (rarely) or orally. The drug is usually tested by injections into the frog, whereas its usual use in man is by the oral route. Hence this author contrasted the comparative results of subcutaneous and oral administration of various digitalis preparations by both methods in the frog. In his assay he reports that Boehringer's "Verodigen" shewed less difference when administered by the oral as compared

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE EDITOR, *The Indian Medical Gazette*, c/o The Calcutta School of Tropical Medicine, Central Avenue, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

Annual Subscription to "*The Indian Medical Gazette*," Rs. 16 including postage, in India. Rs. 18 including postage, abroad.

Papers and articles forwarded for publication are understood to be offered to the *Indian Medical Gazette* alone, and any breach of this rule will be followed by non-publication.

The Editors of the *Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

Original Articles.

THE OCCURRENCE AND DISTRIBUTION OF YAWS IN BURMA.

By G. G. JOLLY, C.I.E.,

MAJOR, I.M.S.,

Director, "The Harcourt Butler Institute of Public Health," Rangoon.

THE disease known as yaws or frambœsia has been observed by medical men in a number of districts in Burma. These observations, however, are very scattered; few of them have been published, and it is therefore only possible to obtain a rather vague and disconnected picture of the distribution of the disease at present. I have been attempting for the last year or two to collect the available information on the occurrence and distribution of yaws in Burma, and I give below in a summarised form what I have been able to ascertain up to date from existing records, personal observation, and correspondence with medical men in Burma.

The history of the disease in relation to India and Burma is of great interest, especially in view of its association with the kindred disease syphilis, and a few introductory remarks on this subject may not be out of place.

Regarding the very early history of yaws, little is known. It has been suggested by several writers that yaws was the disease which afflicted the Israelites during their emigration from Egypt. Manson states that it seems probable that yaws was originally an African disease introduced into America by negro slaves. Castellani on the other hand believes that the disease started in tropical America and spread from there to other parts of the world. It is interesting in this connection to note that true syphilis has recently been found to be endemic among the llamas of South America. Whether the disease was communicated from man to the llama or in the reverse direction will probably never be known, but this discovery seems to lend support to the view that the home of *Spironema pallida* is the American continent. If this be so, *S. pertenuis* may have existed for centuries as its homologue in the old world. The earliest record of the occurrence of yaws in the East is that of Bontius, who in 1718 found the disease endemic in Java, Sumatra and the other Dutch East Indian colonies, where it is still common.

Concerning the introduction of the disease into India and Burma, there is also a good deal of uncertainty. I speak of India and Burma advisedly, because from the disease point of view it is incorrect to regard Burma

as a mere section of India. Epidemiologically Burma holds a unique position as the meeting ground of two great races—the Indian and the Chinese—and is liable to be attacked by the diseases of both. To Powell belongs the credit of first describing yaws in India in 1889, while Major Nolan of the Indian Medical Department first reported its occurrence in Burma in 1894, although he had observed the disease in this country as early as 1889. Two views are advanced as to the introduction of yaws into India. Powell maintains that the disease was first introduced into the tea gardens of Assam in the year 1887. He describes the advent in the following words.—“In 1887 a coolie woman came from Ceylon with three daughters, the youngest being infected with yaws. The other two girls in turn became infected and were constant visitors in the lines in which cases were first seen by me. These four women called the disease ‘*faranghi*’ while all the other coolies called it ‘the new disease.’” Powell’s views are opposed by Ramsay, who holds that Assam was infected by an extension of the disease from Burma. I do not propose to discuss the pros and cons of these two views, except to remark that Powell’s account is so clear and circumstantial that I have no doubt he has described the definite beginning of the disease in the tea gardens of Assam. At the same time there is much evidence to show that there has existed for many years, possibly for centuries, and certainly from before the memory of the present generation, an endemic focus of the disease in the huge area which lies between the Assam boundary and the right bank of the Irrawaddy, and which includes the Chin Hills, the Upper and Lower Chindwin, and the Pakokku Hill Tracts. This area borders on Assam, and it seems by no means improbable, when we reflect upon the numerous invasions of Assam from Burma, starting with the founding of the Kingdom of Ahom or Assam by the Shans in 1229, that at one time or another the disease of yaws was carried into Assam, where it may have persisted unrecognised among the primitive, uncivilised, and uncleanly hill tribes.

When we come to the distribution of the disease in Burma itself, we find a curiously patchwork series of reports indicating that our knowledge of the real distribution of the disease is still very incomplete.

Generalisations are difficult, but broadly speaking we may say that in Upper Burma the disease is mainly confined to the country west of the Irrawaddy, though we have an exception in a focus in the Kyaukse district discovered by Assistant Surgeon Lynsdale, I.M.D. The endemic centre of this area appears to be the Lower Chindwin. In Lower Burma the disease is very infrequent in the Delta, but is commonly met with along

the Tenasserim Coast, increasing in frequency as we proceed south, until we reach the Victoria Point sub-division where it is highly endemic. With regard to Arakan, our information is scanty. So far as I am aware no case has yet been reported from the hill districts of Arakan, though, bordering as this area does on the Lower Chindwin and the Pakokku Hill Tracts, it is likely that the disease will yet be discovered there. Dr. Shwe Ge, who made a detailed investigation of the occurrence of yaws in the Lower Chindwin, discovered a small focus in the Taungup township of the Sandoway district of Arakan and elicited from the natives of the place the interesting information that the disease was formerly widespread in this district.

So much for the general distribution of the disease. I propose now to refer to certain known foci in more detail.

The Lower Chindwin, as we have seen, appears to be the endemic centre of the large area between Assam and the Irrawaddy. It was from Ye-U on the Mu river, a little east of the Chindwin, that Nolan reported the first recorded case in Burma, and it was in the Lower Chindwin that Dr. Shwe Ge made his investigation in 1911. He reported seventy-four villages as known to be attacked in this district alone, and appears to have suspected a much wider distribution. Many other medical men, including Colonels Williams and Fuller-Good, Major Scott, Major Duckworth and Major Rodrigues, have observed and treated cases of yaws in the Lower Chindwin, and the disease is still endemic in the locality.

Coming now to the Upper Chindwin we find the disease reported as "fairly common" by the present Civil Surgeon, Assistant Surgeon Bell. He states that it is well known in the Paungbyin township and in the Tinzin Valley. Apart from this, information is scanty, and I have only a few notes of odd cases seen from the Upper Chindwin. Obviously the distribution has still to be fully worked out for this area.

Regarding yaws in the Chin Hills, which border on the Assam frontier in the neighbourhood of the Lushai country, we have a number of interesting observations. Colonel Beit, I.M.S., in a personal communication, informs me that as far back as 1902-3, when he was stationed at Falam he saw a number of cases which he took to be yaws. He writes "A whole family would be affected. Sores appeared on any part of the body and were contagious. I remember a mother had a son on the breast and the child's lips were badly infected. The question as to whether the disease was syphilis arose, and a doctor from Rangoon who was on a visit to the Chin Hills was in favour of its being syphilis." These were early days when yaws was not so well

known as it is now, but there can be little doubt even from this short description what the disease was. Several other medical men have observed yaws in the Chin Hills, including Dr. Reardon, Major Duckworth, Major Nolan, and recently a short article appeared in the *Indian Medical Gazette* by Assistant Surgeon Bell on yaws in the Chin Hills, which is an interesting confirmation of Colonel Beit's observations more than 22 years ago. Dr. Bell, also stationed at Falam, found a number of cases of yaws coming to hospital and being classified as syphilis, and in a letter to me he states "The disease is very severe in the Chin Hills, and at times many people of a village suffer at one time, whereas other villages are free of the disease." This is a characteristic feature of the disease in Burma, and I have myself seen a village where the majority of inhabitants had been infected, surrounded by other villages where the disease was completely absent. Unfortunately Assistant Surgeon Bell was unable to tour while at Falam, or he might have given us some valuable information as to the distribution of the disease in this area. It is interesting to note that Falam is only about 25 miles in a straight line from the Assam frontier, and Major Duckworth informs me that he has met with yaws among men from the Lushai border about 60 miles from Falam.

We come next to the Pakokku hill tracts, which merge into the Chin Hills and the Lower Chindwin on the north. Here my chief source of information is Major Duckworth, I.M.D. He first saw the disease in 1910 when he was Civil Surgeon, Pakokku. He visited Kandaw, a village about 25 miles to the north of Pakokku town, and found it heavily infected. The villagers stated that the disease had prevailed in this village since beyond the memory of the oldest inhabitant, and their legend was that it was introduced by a Burmese monk, who had returned infected from a pilgrimage to Ceylon. This is of interest when compared with Dr. Powell's account of the introduction of the disease into Assam—also from Ceylon. Duckworth found cases in other villages, particularly in the direction of the Yama Chaung, a river which separates the Pakokku district from Monywa. The Ceylon origin is not the only one advanced in this region, for another story exists locally that the disease was introduced from the neighbouring Monywa district.

If we travel eastward from the Chindwin towards the Irrawaddy, we come to parts of Bhamo and Katha districts. Here the disease also occurs, although it does not cross the Irrawaddy. Major Duckworth has found yaws in villages on both banks of the Kaukkwe river, which traverses the Bhamo and Katha districts in densely wooded country with a heavy rainfall. Major Duckworth writes

"At the village of Thamandank on the banks of the Kaukkwe, with a population of about eighty persons living in twenty-one houses, there are fifteen cases of yaws. At Naung-taw there is one known case, at Okchi there are four cases and so on. The people are wild and shy, and it is difficult to get hold of and to see affected persons in villages situated amidst dense jungle."

Yaws does not seem to have been found to any extent north of Bhamo. This is of course wild country, about the diseases of which little is known, but Major Nolan treated a few cases of yaws at Talawgyi about the year 1893, and I have notes of a few other cases who came into Myitkyina for treatment.

If we next follow the Irrawaddy southwards, we come to the Shwebo district, which now includes Ye-U, from which the earliest cases in Burma were reported. Curiously enough since then few cases of yaws seem to have been noticed in the district. This does mean, however, that the disease does not still occur there, and it may be fairly common.

In the adjoining district farther south—the Sagaing district—I have been able to trace few early records of cases, though Dr. Sen Gupta noted the presence of yaws many years ago in the Chaungu township. In 1925, following upon the investigation of a small but active focus in the Kyaukse district, a search made through the Sagaing district by Sub-Assistant Surgeon U Mg Tin of the Public Health Department, brought to light the fact that the disease is present in a number of villages, and has apparently existed there for long.

It is at this point that yaws has crossed the Irrawaddy and penetrated into the Kyaukse district. This district was thought to be free of the disease until 1924, when Dr. Lynsdale, who had first made acquaintance with yaws at Monywa in the Lower Chindwin many years before, saw a case at the Kyaukse Civil Hospital, which came from the village of Tabatswe. He followed this case up and found the village heavily infected. I visited this village with Dr. Lynsdale and saw about thirty cases in all stages. With the permission of the Local Government, Sub-Assistant Surgeon Joseph was placed on special duty under Dr. Lynsdale to treat these cases, with the result that this focus of the disease now appears to be obliterated.

An important point is that several of the aged inhabitants of the village, when questioned by me, gave a very clear story of the origin of the disease in Tabatswe. About the year 1874, a relative of one of the present residents in this village brought a wife from a village in the Sagaing district. She developed the disease acutely about the time of her arrival in Tabatswe, and from this original case all the others have developed.

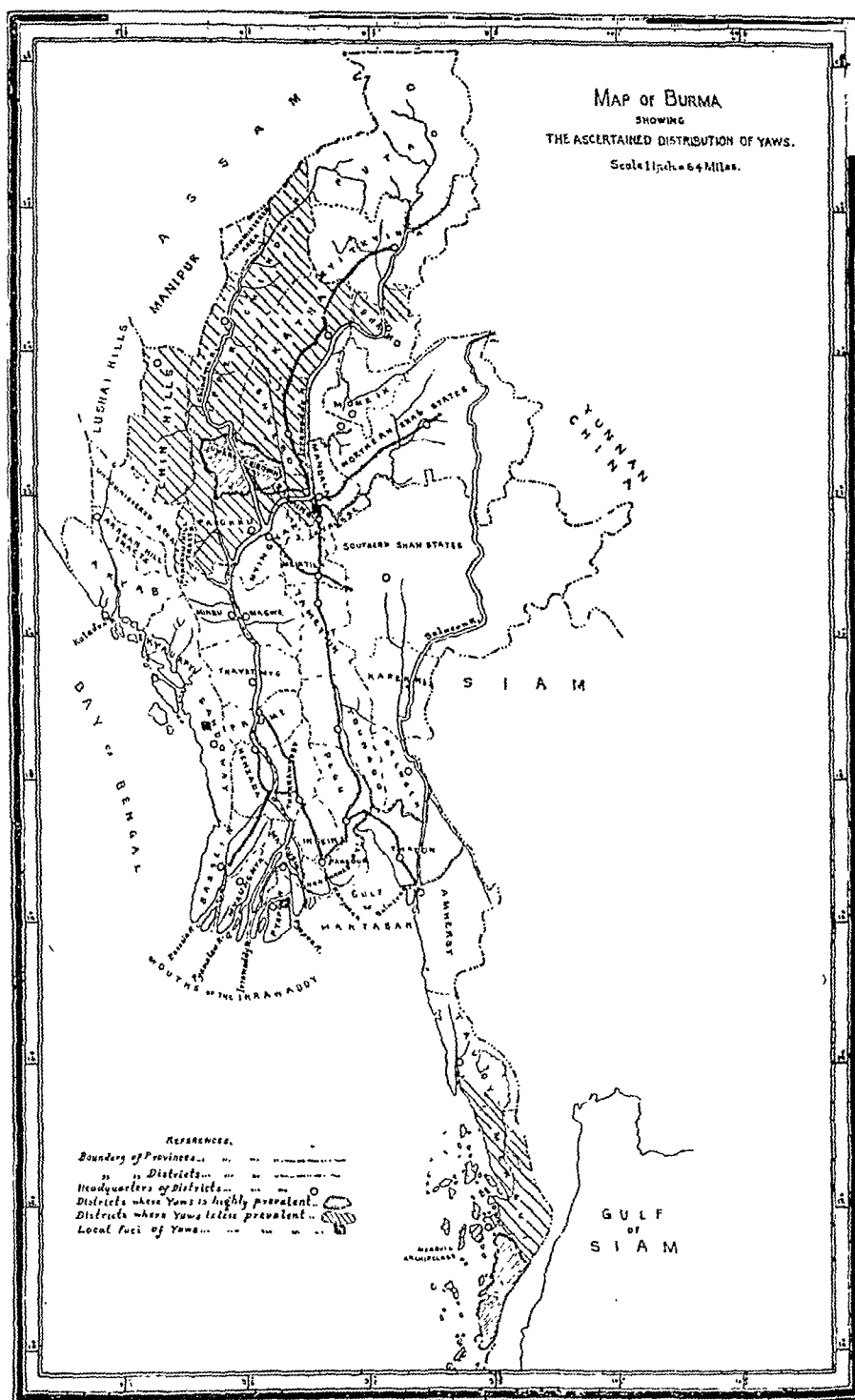
Although this village was heavily infected, the other villages round about were clear of the disease. At my suggestion Dr. Lynsdale tried bismuth tartrate of sodium and potassium—a drug much used in the treatment of yaws in East Africa. The result was excellent, particularly in children. This drug is much cheaper than the arsenical preparations and is given intramuscularly.

The success achieved by Dr. Lynsdale, in dealing with the focus of yaws at Tabatswe, gives one confidence that with better diagnosis of the disease and a little energy in following up cases, we could eradicate this easily cured disease from the more civilised parts of Burma at small expense.

South of the Kyaukse district, on both sides of the Irrawaddy we have only an odd case or two noted, and the Shan States also seem to be free.

The whole deltaic area of Lower Burma appears free from any active focus of yaws, though isolated cases have been observed in several districts. Two families were found infected in the Bogale township of the Pyapon district in 1923, and in this instance a history of infection from Upper Burma was clear. Colonel Fullar-Good reports two cases from a village in the neighbourhood of Kyaiklat, and so on. Regarding Arakan, I have already said about all there is to say. The disease is possibly prevalent in the hills, but we have no records. Apparently it was once prevalent in the plains.

The Mergui district of the Tenasserim Division is the second endemic centre of Burma. It borders on Siam, and is in close touch with Malaya, both countries known to be affected. The Victoria sub-division is particularly heavily infected, and Dr. Daulat Ram, who has spent twenty-four years there, tells me that he considers most of the villagers suffer from yaws at some period of their lives. The Mergui Archipelago is inhabited by a primitive nomadic seafaring tribe known as the "Salon." They are inconceivably dirty, full of yaws, and so universally infected with *Tinea imbricata* that this skin affection is known locally as *Salon-pwe* (Salon-ringworm). They undoubtedly act as a reservoir for yaws, and when a Burman child gets the disease he frequently gives a history of having played with Salon children. At a recent visit to Victoria Point I checked the hospital returns, and found that in the first three months in 1926 sixteen cases of yaws were admitted out of 177 total admissions, and 41 cases treated in the outpatient department out of a total attendance of 1,326. The corresponding figures for the whole of 1925 were 40 out of 642 inpatients, and 117 out of 5,658 outpatients. The widespread occurrence of yaws in the Victoria Point sub-division is a serious matter, and I hope it will be found



possible to have an officer put on special duty to deal with the question.

So much then for a brief survey of the known distribution of the disease in Burma. From a consideration of the ascertained facts, I have arrived at the conclusion that yaws has not been introduced recently into Burma, but must have existed for years, probably centuries. Our present knowledge is very sketchy and needs much amplification. Many cases in my opinion go undiagnosed, and in the hill districts the majority must never be seen. Dr. Ramsay of Assam has pointed out that florid yaws, the text-book description of the primary and secondary stages, is seen characteristically in the plains in the hot weather; but that in the cold season these lesions are rarely seen. The disease in the hills approximates to that seen in the plains in the cold weather. This probably accounts for yaws remaining undiagnosed in great tracts of hill country, when the observer is not thoroughly familiar with the disease.

There is in what is now the Pakokku district, a tract of land known as the "Yaw" country, which in the time of the Burmese kings was ruled by a "Wun" and known as the Wunship of Yaw-Le-Myo. It is bounded on the north by the Gangaw township of the Lower Chindwin, and on the west by the Chin Hills, both districts in which we know yaws to be very common. The Yaw country was and is inhabited by a people known as "Yaws," supposed to be descended originally from the Shans who founded the Kingdom of Assam, and although it is probably a coincidence, one wonders whether there could possibly be any historical connection between the name "Yaws" by which the disease is usually known in the British Colonies, and this district of "Yaw" near the heart of Burma's principal endemic area, in which the disease still persists.

A final note regarding the names given to this disease in Burma will not be out of place. Castellani states that *bucna* is the name by which yaws is known in Burma. This word however means "ringworm" in the Burmese language, and it is not the name given to yaws in the parts of Burma where the disease is in evidence. In Upper Burma *kwe-na* and *kwe-yoga* are the usual names and, as pointed out by Nolan, *kwe-kyet-kyee*, *kwe-pouk-pouk* and *kwe-bon* are terms used to describe different clinical types of the disease. In Lower Burma and in the Kyaukse district, the common name is *toungoo-na*, while the Salon tribe called it *parw-kwai*.

The accompanying map of Burma shows graphically the distribution of the disease as described in this paper.

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NOTES ON CASES OF PHTHISIS TREATED BY SANOCRY SIN AT LUCKNOW.

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MANY clinical reports on cases treated with Sanocrysin have now been published in medical literature. Those most accessible are to be found reported by the Medical Research Council in the *British Medical Journal* of April 18th, 1925 and July 24th, 1926, and in the *Proceedings of the Royal Society of Medicine* for 1926. There are many more to be found in Mollgaard's book on the chemotherapy of tuberculosis in the *Acta Medica Scandinavica* and in other journals and books.

It may be of interest, however, to publish records of a few Indian cases so treated, having regard to the generally more acute type of tuberculosis seen in this country, and to the fact that occurrences nearer home are apter to bring conviction than what happens many thousands of miles away. I was in Copenhagen in May 1925 and saw about 100 Sanocrysin-treated cases there and elsewhere in Denmark. Besides Mollgaard himself, I also met Secher, Wurtzen, Gravesen and other clinicians who were using Sanocrysin and heard their views on its action. Their views were by no means identical either as regards dosage or other details, but all seemed unanimous that the drug was a new and valuable weapon in our armoury against tuberculosis.

While I was in Copenhagen there happened to occur the annual meeting of the Danish Medical Society, a gathering of several hundred medical officers from all over the country. The subject for discussion was Sanocrysin and though the proceedings were in Danish, through their kindness in seating me next to a doctor who interpreted, I was able to follow the more important points. Several of the speakers were general physicians who, previous to the introduction of Sanocrysin, had no unusual experience in tuberculosis, but I was particularly impressed

with the opinions of Gravesen, already of world-wide repute amongst tuberculosis physicians and famous for his work on collapse therapy. I visited Gravesen's sanatorium at Vejle fjord and found that he was using Sanocrysin extensively and considered that it occupied an important place in our treatment. Before I left Denmark I obtained permission to take some Sanocrysin and some of the antitoxic serum that goes with it to India, and it is on the work done with some of this I write the report on these few cases.

Sanocrysin is a fancy name given to a double thiosulphate of gold and sodium. Into the theoretical considerations that led Mollgaard to select this compound as the ideal for attacking the tubercle bacillus in the body I will not enter, for we are not now concerned with them. Nor are we now interested in its physico-chemical properties except to know that it is readily soluble in water.

For therapeutical purposes Sanocrysin is dissolved in distilled water in a five per cent. dilution and given as a rule intravenously. The drug is supposed to be directly bactericidal for tubercle bacilli and by its diffusible properties to be able to penetrate to the bacilli in the body, provided they are not too extensively surrounded by fibrosed tissue. Hence it acts better in a more recent case than in a fibroid case. Since most cases of chronic phthisis are fibrocaseous, i.e., possess both pneumonic and fibroid characters, the activity of Sanocrysin will vary in individual cases according to the relative amount of each present. In a tuberculous patient a dose of Sanocrysin is followed by a febrile reaction, and often by other phenomena. It is not intended to describe these reactions here except to say that they are sometimes accompanied by a rash and by albuminuria and that they may be severe, and have even been fatal, and are such as to render it imprudent to administer the drug except to a patient in an institute or under careful nursing.

The presumption is that the reactions are caused by absorption of the toxins from the dead bacilli, and therefore are somewhat like the effect of a dose of tuberculin. To combat the reactions Mollgaard has made an anti-serum from the horse which is given only in cases where a severe reaction seems to be impending. I took a supply of this serum with the drug, but have not so far had occasion to use any, and it seems that its use is going out even in Denmark, as more moderate doses of Sanocrysin are being used and severe reactions are not aimed at to the extent they were at first.

Regarding the dosage there is difference of opinion as to whether the larger doses, beginning the course at first with 0.5 or even 1.0 gm., should be used as was done when the drug was first introduced, or whether the

course should be begun with 0.1 gm. or less. The advocates of the former method, chief of whom is Secher himself, aim at a sterilising therapy similar to the action of salvarsan in syphilis. They hold that the smaller doses are likely to "animate the inflammation already present." They claim to have seen harm arise from small initial doses. Others on the contrary begin with 0.1 gm. and advance continuously therefrom. Personally I thought from what I saw that the bigger doses were too heroic, and often leave the patient debilitated at the end of the course. I have struck a middle course and usually begin with 0.25 gm. or with less in a case that I would suspect from previous experience with tuberculin to be supersensitive.

Theoretically the course should last, with injections at intervals when the reactions subside, until the patient is afebrile. A course may last about two months and the patient will then do well to go away for an after-cure, preferably in some sanatorium. If the drug is used intelligently—and on that word depends much—it is an aid to the recovery of many cases and, I believe, the deciding factor in some. The critic requires more evidence than a personal impression or vague clinical belief by users that benefit is to be obtained from the drug. In pulmonary tuberculosis, apart from the record of ordinary physical signs, we have two objective data which can be recorded by impartial observers and about which there can be no doubt. One is the disappearance of tubercle bacilli from the sputum; the other is the appearance of changes in the tissues of the chest shown by skiagrams, taken before and after a course of Sanocrysin.

The disappearance of bacilli can be brought about often by various methods of treatment; as with them, so with Sanocrysin, the bacilli may be noted to be becoming fewer in number and more attenuated in structure until their final disappearance. The changes in the x-ray appearance are from fluffy to more linear shadows together with entire clearing of certain areas; that is to say some infected areas apparently undergo resolution and others heal by fibrotic changes. Now it is my belief, and I believe it is that of most who have used Sanocrysin and studied the skiagrams, that these changes occur more rapidly in a Sanocrysin-treated case than in one undergoing a purely sanatorium regime.

A few cases treated with Sanocrysin at King George's Hospital, Lucknow, will now be briefly reported. The temperatures referred to are in all cases rectal.

Case 1.—Schoolboy, aged 18. Began to be ill about 5 months ago. On admission he had a cough with an evening temperature of 101°F. and morning of 98°; slight hæmoptysis. Signs of pleurisy over great part of left side behind, and infiltration of lung at apex both back and front. On right side behind, infiltration of right lower lobe, especially at its apex.

Sputum muco-purulent; T. B. + + +.

X-ray report:—Left side:—(1) Radio-opaque homogeneous shadow about 1½ inches above the base due to pleural thickening. (2) Some shadows mostly in the upper lobe, one fairly dense, the others fluffy. Right side:—Pleura clear. Fluffy shadows at base and lower portion of the middle lobe.

Sanocrysin treatment was started and in the course of a month four injections had been given, beginning from 0.25 gm. and working up to 1.0 gm., a total of 2.75 gms.

In this short period his temperature had come to normal and his weight had increased by 7½ lbs. He felt so well that he left hospital, although his course was incomplete.

No second x-ray examination therefore was obtained. He had albuminuria during the latter part of the course.

Case 2.—Clerk, aged 24. Ill for nearly three years off and on with diseases diagnosed at the time as fever, influenza and dysentery. On admission had cough with evening temperature to 100°F. and morning 98.4°F. Weight 108½ lbs. Slight dullness in left axillary region and inspiratory crepitations on the left side, especially in the infra-clavicular and axillary regions.

Sputum muco-purulent; T. B. + +.
X-ray report:—Right side: upper lobe, peribronchial thickening and fluffy shadows about the middle. A few calcified nodules.

Left side:—Upper lobe, a few calcified nodules and some fluffy shadows near apex and middle.

In the course of 5 weeks a total of Sanocrysin 4.2 grammes was given. The patient was discharged and after a short interval went to the hills, where he has spent the summer. Occasional albuminuria was a feature of the early, and very obstinate and severe vomiting after the last two injections.

On leaving hospital the temperature was about the same as on admission; the weight was 2 lbs. less. The weight at one time had increased to 113 lbs. but he lost 7 lbs. during his vomiting. Bacilli were present in the scanty sputum, but only about 1 in 6 fields.

X-ray examination on discharge: areas of infiltration in both lungs: shadows more defined and dense than in previous examination: disease appears arrested.

He is now, 6 months later, reported to be well; is afebrile, without sputum and taking active exercise.

Case 3.—Student, aged 24. Ill for about 2 years. In a sanatorium for the last 8 months, where the left chest was tapped 12 times. On each occasion 20 to 30 ounces of fluid were removed, at first clear fluid, but for the last twice the fluid has been yellow-brownish and purulent.

Patient is thin: the left chest appears full of fluid. The abdomen is somewhat puffy and is tender to palpation round the umbilicus. T. B. +. Temperature from 98° to 100°F. Morning pulse 96.

X-ray report:—Shadows in the whole of the left side of the chest.

On right side, a few shadows in upper lobe, fluffy in nature.

In the course of 3 months the patient was given 5.5 grammes of Sanocrysin. Albuminuria was a frequent complication and delayed treatment. The abdominal complication also at times gave trouble.

He left hospital and returned to the sanatorium in apparently the same condition as on admission to hospital. Weight and temperature the same. Bacilli fewer in number and having a beaded appearance. X-ray picture unchanged. A later report from the sanatorium says that he is better, but still with an evening temperature of 99° and a rapid pulse.

Case 4.—Medical practitioner, aged 31. Ill for 9 months. Mountain and open air treatment hitherto without benefit. Temperature from 98° morning to 100°F. evening. A stout man weighing 156 lbs.

Signs of consolidation of the upper lobe of right lung and of partial consolidation of right base.

Sputum, 4 ounces. T. B. + + +.

X-ray report:—Right side:—(a) Radio-opaque shadows, mostly pleural in character, in the region of the upper lobe; (b) area of infiltration at the base, mostly fluffy (active). Left side: small areas of infiltration, some calcified, some fluffy.

Treatment by pneumothorax was attempted; but it was found that a very partial pneumothorax only could be made on the right side, owing to extensive adhesions. This treatment was abandoned. During the following 6 weeks 4.65 grammes of Sanocrysin were administered. Albuminuria gave little trouble; but after one dose of 1.5 gm. vomiting was prolonged and obstinate and caused 8 lbs. loss in weight.

At the end of the course the physical signs showed great improvement. There was slight dullness in the right mammary region, and broncho-vesicular breathing at the right apex in front, with fine crepitations over the dull area. Behind there were showers of fine crepitations at the apex of the right lower lobe, but nothing abnormal now at the base.

X-ray report. Right side: pleural shadows very much diminished. The areas of infiltration are less fluffy and more fibrous.

Sputum little in quantity: T. B. absent on 3 occasions. Weight 150 lbs. Temperature 97.6° morning, 99.4°F. evening. The patient left to spend the summer in the hills, and recent reports show him in fair health, afebrile and taking active exercise.

Case 5.—Musician in a jazz band, aged 27. Had been ill only for one month, but had continued at his work, often playing at dances into the early morning hours. He was admitted with profuse and repeated hæmoptysis and temperature from 99° morning to 102° evening. A man of poor physique and looking very ill. Weight 98 lbs. Physical signs of consolidation of the right upper lobe down to the fourth rib in front and the scapular spine behind, also of the apex of the right lower lobe, and of pleurisy at the right base. Scattered râles throughout the left lung in front, especially in the flank. Tenderness on palpation round the umbilicus. Sputum 6 ounces, bloody and mucopurulent. T. B. + + +.

X-ray report:—Both apices clear. Right side: fluffy shadows radiating from the hilum in upper and middle lobes. Left side: parenchyma of lung almost clear, but dense shadows at the hilum due to old and calcified glands.

An attempt was made to collapse the right lung by pneumothorax, but this was only partially successful owing to extensive pleural adhesions; after four injections of air the method was abandoned. Sanocrysin treatment was then started and in the course of two months seven injections were given, a total of 3 grammes of Sanocrysin. The doses were small, because the patient's temperature was high, often 104°, and he was already ill with toxic symptoms. Vomiting was frequent; albuminuria occurred only after the first injection.

The patient became worse and after he had lost 13 lbs. the Sanocrysin treatment was abandoned. He continued to run a constantly high temperature and died 5 weeks later, after losing another 12 lbs. in weight.

This was a case of galloping broncho-pneumonic phthisis, whose course held an even tenour to the end and seemed to be in no way affected by the Sanocrysin injections.

Case 6.—This case was a leper, a middle-aged countryman. The leprosy was of both anæsthetic and nodular variety, but not of advanced character. There was no suggestion of tuberculous infection in this case and Sanocrysin treatment was tried on the ground that since the drug appeared bactericidal for tubercle bacilli, it might also be so for another acid-fast organism.

In the course of three weeks four injections of Sanocrysin were given, 0.5, 0.75, 1.0 and 1.5 grammes. After the two middle injections the temperature was slightly raised for a few hours, and after one of them the patient complained of malaise. There was no

albuminuria and no vomiting, even after the last large injection. The leprosy lesions seemed unaffected.

The cases above reported are few in number and varied in type; but so far as conclusions may be drawn from a few cases it is fair to make them, because such conclusions agree with previous observations in Denmark.

In Case No. 5 Sanocrysin in the doses administered had no influence at all on the course of a galloping phthisis. In Case No. 6 the drug had no influence on leprosy, and this has a further interest as supporting the advocacy of the apparent specificity of the drug for tubercle bacilli.

In Case No. 3, of extensive disease and poor resistance, Sanocrysin had little, if any, influence.

In Cases Nos. 1, 2 and 4 the influence of the drug appears to have been entirely for the good. These were cases of more usual type than the others, cases of chronic phthisis with a fair resistance to the disease.

It might be said that the clinical improvement these cases received is not infrequently seen resulting from simple sanatorium treatment. That is true; but the *x*-ray evidence is objective and goes further.

Case 1 was not *x*-rayed a second time, but Cases Nos. 2 and 4 were skiagraphed immediately before and after their course and the changes in the appearances in so short a time were striking.

A further three cases are now under treatment and are progressing favourably, resembling Cases Nos. 2 and 4 in their nature.

To sum up, I think that in Sanocrysin we have another valuable weapon in fighting pulmonary tuberculosis. It stands to reason that the drug must be used intelligently and only in cases selected for its treatment, and the *x*-ray appearances will be a help in this.

At present cases should be treated only in an institution or under careful nursing. In many ways the action of Sanocrysin is like that of tuberculin, a fact that would be expected from the assumed nature of its action. Another necessity is that the patient should be intelligent and able to understand that he may have severe reactions and lose weight during the course, after which it will be advisable for him to go to the hills for an after-cure.

The physician should not undertake the use of Sanocrysin until he has read of or seen something of its use and understands the possible dangers that may arise, and how to combat them. That is only common sense, and if that faculty be exercised it would seem that we have in Sanocrysin a remedy that may shorten the length of treatment, increase the immunity of the patient, and in some cases even make the difference between life and death.

I am indebted to Dr. Raghunandanlal, Radiologist to the Hospital, for the *x*-ray reports.

OBSERVATIONS ON MARRIS'S ATROPINE TEST IN ENTERIC FEVERS.

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Introduction.—It is a well-known fact that atropine accelerates the heart beat. Every clinician must also have observed that in the typhoid group of fevers the pulse rate is comparatively slow and does not increase by ten beats per minute for every degree rise of temperature, as it does more or less in other febrile conditions. H. Fairley Marris, in 1916 in a war hospital for typhoid fever cases, found that in these fevers the pulse rate was much less, if at all, accelerated by the hypodermic injection of 1/33 gr. of atropine sulphate than in other febrile conditions or in a healthy individual, where an increase of about twenty to forty beats per minute takes place after the injection. This non-response to atropine he found to be so constant with the typhoid group of fevers that he began to use it as a means of diagnosis.

The test.—The patient remains as quietly as possible in bed. The test is not done until at least one hour after the last feed. The pulse is counted until it is found to be steady and the average noted down: 1/33 gr. of atropine sulphate is then injected hypodermically. Next the maximum acceleration due to atropine has to be determined; it is generally found to occur between 25 to 30 minutes after the injection. Therefore 25 minutes after the injection, the pulse is counted every minute, until the acceleration due to the injection begins to pass off.

[In our series, we noted the pulse 15 minutes after the injection, and in most cases began to look for the maximum acceleration by counting the pulse every minute, beginning with 20 minutes after the injection and going on till 35 minutes after, when necessary.] The difference between the average pulse before the injection and the maximum acceleration due to it (= 'escape') is then noted. If the 'escape' is 14 or less, the reaction is positive and the diagnosis is typhoid or paratyphoid; if it is 15 or over, the reaction is negative and excludes the typhoid group of fevers. The test is most often positive between the 5th and the 14th day of fever, the 10th day giving the greatest percentage of positive results.

Age and dosage.—During the last six months we have tried the atropine test on the majority of 'fever cases' admitted to the Medical College Hospitals, Calcutta, in the First Physician's wards, under Major H. Hingston, I.M.S. Some difficulty arose as

	Date.	Initials.	Age.	Sex.	Day of disease.	Acceleration due to atropine 'escape.'	Result.	Final diagnosis.
1	29-3-26	E. A. C.	17	M.	7th	12	+	Paratyphoid A. Blood, stool, urine cultures +; aggl. + 1:250.
2	20-4-26	V. O'B.	10	F.	7th	13	+	Typhoid. Blood and stool cultures +; aggl. + 1:250.
3	23-4-26	P. M.	32	M.	9th	3	+	Typhoid. Blood, stool cultures +; aggl. + 1:250.
4	2-5-26	E. R. O'C.	28	M.	12th	12	+	Kala-azar—clinically. Spleen ++; reacted to urea stibamine — to typhoid.
5	10-5-26	R.	7	F.	10th	6	+	Typhoid. Blood, stool, urine cultures +; aggl. +.
6	13-5-26	H.	12	M.	13th	5	+	Typhoid. Blood, stool cultures +; aggl. + 1:250.
7	13-5-26	L.	11	F.	15th	6	+	Typhoid. Blood, stool cultures +; aggl. + 1:250.
8	15-5-26	C.	12	F.	20th	5	+	Typhoid. Blood, stool cultures +; aggl. + 1:250.
9	16-5-26	P. K.	15	F.	12th	4	+	Typhoid. Blood, stool, urine cultures +; aggl. + 1:250.
10	20-6-26	G. S.	17	F.	12th	1	+	Typhoid. Blood, stool, urine cultures +; aggl. + 1:250.
11	4-7-26	S. B.	35	F.	7th	10	+	Typhoid. Blood culture +; aggl. — 1:25.
12	9-7-26	K. M. R.	15	M.	3rd	15	—	Seven-day fever.
13	5-7-26	I. K. D.	28	M.	12th	0	+	Typhoid. Blood, stool, urine cultures +; aggl. + 1:250.
14	10-7-26	J. D.	30	M.	10th	18	—	Lobar Pneumonia. Typhoid findings —.
15	11-7-26	E.	40	M.	7th	19	—	Kala-azar + flagellates. Typhoid findings —.
16	26-7-26	A.	22	M.	4th	22	—	Seven-day fever.
17	29-7-26	W.	25	M.	5th	20	—	Seven-day fever.
18	30-7-26	A.	18	M.	15th	14	+	Typhoid. Blood, stool, urine cultures +; aggl. —.
19	31-7-26	L. L.	16	M.	6th	21	—	Seven-day fever.
20	6-8-26	F. O. R.	12	M.	12th	8	+	Typhoid. Blood culture +; aggl. + 1:125.
21	17-8-26	S.	19	M.	18th	14	+	B. coli infection. Urine culture +. Typhoid findings —.
22	26-8-26	K.	22	F.	20th	6	+	Typhoid — clinically.
23	26-8-26	C. B. P.	10	M.	10th	14	+	Typhoid. Aggl. + 1:125. Blood culture +.
24	26-8-26	B. L. G.	28	M.	16th	12	+	Typhoid. Blood culture +; aggl. + 1:250.
25	26-8-26	R.	6	F.	9th	18	—	Kala-azar, clinically. Typhoid findings —.
26	27-8-26	T.	10	M.	15th	10	+	Typhoid. Aggl. + 1:125.
27	22-8-26	S. C. C.	30	M.	20th	20	—	Typhoid. Blood culture +; aggl. — 1:25.
28	8-7-26	S. N. P.	23	M.	8th	41	—	Cerebro-spinal meningitis proved by lumbar puncture — meningococcal.
29	1-9-26	N. D.	23	M.	13th	4	+	Paratyphoid A. Aggl. +.
30	2-9-26	H.	20	M.	20th	13	+	Broncho-pneumonia.
31	4-9-26	E. C.	10	F.	8th	12	+	Typhoid findings —.
32	7-9-26	W. C.	40	M.	8th	19	—	Typhoid. Aggl. + 1:125.
33	13-9-26	F.	19	M.	6th	20	—	Kala-azar — clinically. Typhoid findings —.
34	12-9-26	H. R.	25	M.	6th	17	—	Lobar Pneumonia.
35	17-9-26	—	—	—	11th	11	+	Typhoid.
36	29-8-26	T. T.	36	M.	4th	24	—	Blood culture +.
37	21-8-26	W. J.	9	M.	8th	24	—	B. T. Malaria.
38	15-9-26	N. S.	30	M.	3rd	21	—	Pyrexia of uncertain origin.
39	27-8-26	F.	2	F.	10th	10	+	Seven-day fever.
40	19-9-26	R.	16	M.	5th	18	—	Typhoid. Blood culture +; aggl. + 1:250.
	20-9-26	T.	25	F.	2 months	28	—	Seven-day fever.
							—	Tuberculosis of the lung.

to the dose of atropine sulphate to be injected. Marris used $1/33$ gr. uniformly. But unlike Marris—whose “experience has been confined to males between 17 and 47 years of age”—we had quite a number of children under our care. The dose which we chose for patients below the age of 10 years in our series was $1/50$ gr. This may appear quite formidable for some of our very small patients, but children—especially when under the influence of typhoid infection—were found to bear atropine very well. Case No. 38, an Anglo-Indian baby, 2 years old, showed no other untoward symptoms than dilatation of the pupils, after the injection.

Results.—The results obtained are given in tabular form, together with the agglutination or cultural diagnosis obtained in each case. The agglutination and cultural tests were carried out in the laboratory of Major G. Shanks, M.D., I.M.S., Professor of Pathology, Calcutta Medical College, and for the former Dreyer's technique was employed.

Analysis.—

(a) Typhoid cases. We had 22 cases in our series. Of these 20 gave a positive atropine test.

(b) Of the negative cases—

(i) Case No. 27 was tested on the 20th day of disease when the reaction is usually unsuccessful.

(ii) Case No. 34, though he gave a negative reaction on the sixth day, was positive on the eleventh day of disease.

(c) Of the positive cases,—there is no bacteriological proof about Case No. 22, but clinically it was a typical typhoid case. The patient, a Goorkha lady, was admitted very late, blood culture was done on the 20th day of disease and was sterile. Unfortunately, this case also gave a persistently negative agglutination reaction, as also did the culturally positive cases—Nos. 11, 18, 27.

(d) Case No. 21, a case of *B. coli* infection gave a positive reaction. Whether this was an anomalous reaction or whether *B. coli* infection behaves more or less like its near relative *B. typhosus* infection, we cannot say from our limited experience.

(e) Of other febrile conditions with a comparatively slow pulse—

(i) Seven cases of so-called ‘seven-day fever’ in our series gave negative results.

(ii) One case of cerebo-spinal meningitis, Case No. 28, showed a marked ‘escape.’

(f) Except for Case No. 4—a case of kala-azar, with typhoid-like onset—and Case No. 30, a case of broncho-pneumonia, without any positive bacteriological findings, the atropine test with us has been a most reliable guide to the diagnosis of the typhoid group of fevers.

Conclusion.—

From the above, it is evident that though extremely simple in use, the atropine test is

very useful in its results. It cannot, of course, claim to be as reliable as a positive blood-culture, but where facilities for elaborate laboratory findings are not available, the test can give dependable results, especially in a puzzling case, and as such it may prove a very useful weapon for the *mofussil* practitioners.

In conclusion, I would like to record my gratitude to Major H. Hingston, M.D., I.M.S., First Physician, Medical College Hospitals, under whose guidance and initiative these tests were carried out and who has very kindly permitted me to publish these results. I also take this opportunity of expressing my thanks to Major G. Shanks, M.D., I.M.S., who supplied us with all the laboratory findings.

GASTRO-ENTERITIS IN ALIPURAM JAIL, BELLARY.

By V. J. LOPEZ,

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FULMINATING bacillary dysentery, choleraic dysentery, or gastro-enteritis—the term ordinarily used in this jail—is a malignant form of dysentery which the average medical practitioner is not ordinarily called upon to treat—particularly in rural areas, where few cases of fatal illnesses are seen and diagnosed by medical men before the fatal termination, or when they are called in and are liable to err in diagnosis in the absence of laboratory facilities—as this disease closely resembles cholera. Consequently no reliable statistical figures are available and this type of dysentery does not get the notice it deserves. Information from text books is also scanty as it is generally considered that this malignant form of dysentery is not common.

Jails, of course, are ideal places for the study of certain diseases in their different phases, and this jail—with its exceptionally large population of one particular class of men from a limited area—has offered unique facilities for the study of dysentery. It was opened in October 1921 for the detention of men convicted in connection with the Moplah rebellion and since then over ten thousand convicts have been interned in this jail, the largest number accommodated at any one time being 6,000. The population is now over 4,000. The health of the men on admission to jail was deplorably bad. Apart from the fact that there was a disproportionately large number of old men and of extremely debilitated individuals, hookworm infection was cent. per cent., the ravages of this disease had evidently caused irremediable impairment of health in some cases. Dysentery was also rife amongst them. These facts, together with the hardships, privations and exposure they had to put up with during the rebellion, had greatly lowered their

powers of resistance to all diseases, and to gastro-intestinal complaints in particular.

During the early part of 1922, with an average population of 6,000, the average daily sick used to be in the neighbourhood of 900, mostly "bowel" cases. Strange to say, although dysentery was very prevalent at the time, with occasional admissions for "gastro-enteritis," the fulminating type did not manifest itself in epidemic form until November 1923. Stranger still, this type is not common in other jails in India except where Moplahs are interned, although the ordinary type of bacillary dysentery prevails in most jails in India. Majors Cunningham and King in a special investigation conducted in the jails of Bengal and Eastern Bengal definitely proved that bacillary dysentery was much commoner than the amoebic form, and in one of their reports, published in the *Indian Journal of Medical Research*, Vol. IV, page 457, they state that the fulminating type is evidently very rare, as no cases were seen by them in any of the jail hospitals during their investigation. Further, during their examination of 157 cases of dysentery they isolated 96 strains of dysentery organisms, 79 per cent. of which gave reactions with Flexner high-titre serum, but none of these were of the fulminating type. This is interesting in view of the generally accepted theory that Shiga's bacillus is ordinarily responsible for the fulminating type, and this has also been proved to be the case in this jail. One wonders why the Moplah in particular should harbour Shiga's bacillus in preference to Flexner's. Evidently infection by this organism is common in Malabar, if one can pin much faith to the history given by some of the inmates of this jail. Besides, we occasionally read in medical journals of cases reported by practitioners from that area under such names as "choleraic dysentery," "dysenteric cholera," etc., and it is possible that genuine cases of fulminating dysentery may be erroneously returned as cholera.

The first epidemic of "gastro-enteritis" broke out in this jail in November 1923 when cholera was suspected, but the prompt aid rendered by the Director of the King Institute of Preventive Medicine, Guindy, Madras, and the arrival of a mobile bacteriological unit from that institution proved beyond doubt that the disease was a malignant type of dysentery, the offending organism being the bacillus of Shiga. There were three smaller outbreaks of the disease during June-July 1924, December 1924-January 1925 and May-June 1925. Altogether 520 cases were treated up to the end of 1925, of which 40 proved fatal—a death-rate of 7.7 per cent. During these periods admissions for ordinary bacillary dysentery and diarrhoea of enteric type were also considerably increased. The largest number of admissions were from

amongst the subjects of chronic dysentery, old men and permanent invalids, which fact goes to prove that "resisting powers" play an important part in the onset of the disease and that fulminating dysentery is not necessarily an acute disease, but often an acute exacerbation of a chronic disease. In some cases it was noticed that the same men had 2, 3, and even 4 attacks at different periods. During all these outbreaks samples of blood-serum and faeces in glycerine and cultures on McConkey's medium were systematically sent to the King Institute of Preventive Medicine, Guindy, for examination. The samples of blood-serum in a very large percentage of cases gave positive agglutination reactions with the bacillus of Shiga, mostly to dilutions of 1 : 200. As regards the faeces, although the bacillus of Shiga was isolated from a large number of cases whilst the mobile bacteriological unit worked on the spot, from the faeces sent by post to Guindy "dysentery-like" organisms were isolated only in some cases. The extreme delicacy of the organisms and their probable death in transit may possibly account for this low figure of isolation of dysentery bacilli in faeces sent by post.

Stools were also systematically examined under the microscope and in no case was a vibrio-like organism detected, but the cellular exudate was in most cases that characteristic of bacillary dysentery.

Causation. As will be evident from the foregoing paragraphs, predisposition existed in practically all cases admitted to this jail. The bacillus of Shiga has been proved to be the offending organism, and dysentery, diarrhoea and gastro-enteritis are only different manifestations of the same disease, but the immediate exciting cause is worth considering. The sanitary arrangements in this jail are all that could be desired. The convicts are housed in large airy barracks (occupied in the past by British troops), enclosed by barbed wire fencing. Excreta and refuse of all sorts are incinerated on the spot and urine is trenched in selected spots in the spacious jail garden. The fly-nuisance is practically nil. Foster, after his special investigation into the causes of jail dysentery in Bengal in 1907, wrote that the disease was not spread by water, dust or infection of food-supplies, but by case-to-case infection and by such convalescents as were "bacilli carriers." I would like to dilate on these points as regards this jail, bearing in mind that the outbreaks of gastro-enteritis here have been of seasonal incidence.

Water-supply. The water hitherto used by the convicts, although passed through Jewel filters and chlorinated and perfectly potable from a bacteriological point of view, has on repeated examinations proved to be highly alkaline, and contains an excess of soluble sulphates which of course filtration cannot remove, and which are likely to cause gastro-intestinal trouble. During

the summer months the level of the water at its source gets low, and, containing as the water normally does an excess of sulphates, the probability is that during this part of the year it supplies sulphates in a more concentrated form than under ordinary conditions when the water level is high and the sulphates are freely diluted. This may act as one of the immediate exciting causes during this particular period; but for the winter outbreaks other factors have to be looked for. Since the change of water-supply from October 1925 there have been no regular epidemics of gastro-enteritis, although the disease has not by any means completely disappeared from this jail. Perhaps it is too soon to definitely conclude that the absence of an outbreak since October 1925 is due entirely to a change in the water-supply.

Meteorological Conditions. The prevailing high winds, together with the great variations between day and night temperatures and the frequent sand storms, particularly during May, June and July, possibly causing ingestion of dust and sand which irritate the gastro-intestinal tract, are all, I think, factors worth considering as exciting agents in the causation of gastro-intestinal trouble amongst men who are mostly subjects of chronic or latent dysentery.

During the winter months the night temperature is often in the neighbourhood of 60°F. and there are great variations between maximum and minimum temperatures, which are conditions different to those existing in Malabar; and it is possible that such climatic changes to which the convicts are unaccustomed may tend to cause active symptoms among latent cases. Here I must mention that there is a large number of men who have become quite used to local conditions and who are hardly ever sick, but there are again a good few others who on admission to jail had well passed the stage of recuperation, and these are the men that nearly always suffer from intestinal or gastro-intestinal troubles.

Food-supply. The possibility of infection of the food-supply is negligible. The most scrupulous care is exercised in the "passing" of fresh rations and the cooking and distribution of food, and the fly nuisance is practically nil.

Case-to-case infection and convalescents as Bacilli Carriers.

The "bowel control" in vogue in this jail almost entirely eliminates the possibility of case-to-case infection from post-dysenteric and latent cases, although I must admit that the complete detection of all latent cases—as will be seen later—is not quite so easy as some would think. A "bowel gang" was introduced within a short time of opening the jail and has now been in existence for over four years. All convicts in this gang are segregated in a separate enclosure with all necessary conveniences, and are not on any account allowed to mix with the rest of the jail population. Here they are closely observed and treated as considered necessary, and are discharged from this gang only after they have been

free of all signs of dysentery for 9 to 12 months consecutively. There is also a permanent "bowel gang" in another enclosure for very chronic cases. In the "bowel gang" are placed not only post-dysenteric discharges from hospital but also all cases of latent dysentery. These latter are detected by the routine macroscopic examination of stools, as suggested by Lieut.-Col. J. Cunningham, I.M.S., in his article on latent dysentery published in Vol. VI, No. I, page 70 of the *Indian Journal of Medical Research*. This goes on throughout the year, the examinations being conducted block by block, each block being inspected for a period of 14 consecutive days at a time. The strange fact with regard to this examination is that, although it has been in vogue for four years, at every fresh examination one is able to spot a few cases of latent dysentery previously undetected. The only plausible conclusion is that cases of latent dysentery do not always exhibit signs. In spite of all these precautions the question of "bacilli carriers" who show no latent signs still strikes one forcibly, although all convicts and warders connected with the handling of rations, the cooking and distribution of food, and those on water duties, etc., are men who have been thoroughly examined and found to be "non-carriers" of organisms of the dysentery and enteric groups. Macroscopic examination of the stools of these men is also carried out systematically.

Clinical features.—The onset of the disease is fairly sudden, commencing with diarrhoea and vomiting. The stools at the commencement are loose, but often faecal in character. These as a rule are soon replaced by watery motions with enormous amounts of mucus, with or without blood, and sometimes by pure serous fluid with flakes of mucus. The vomit, at first the contents of the stomach, soon becomes watery in character. Points worthy of note are the extreme toxæmia and very early collapse, irrespective of the number of stools and vomit. Collapse is not confined to the cases with numerous stools and the collapse and loss of the radial pulse are in most cases out of all proportion to the amount of fluid lost by vomiting and purging. Nearly all cases have fever of varying degrees. Thirst, restlessness, pain and a burning sensation in the epigastrium and the lower part of the abdomen are prominent symptoms. Air-hunger is nearly always present in cases with early collapse. Cramp, although complained of by some, is not a constant symptom. Retention of urine was pronounced only in a small percentage of cases. In fatal cases, death generally takes place within the first 24 hours of onset of the disease. After this critical period improvement though slow at times is steady.

Treatment.—In cases of collapse, with signs of dehydration, treatment is followed on the lines laid down by Sir Leonard Rogers.

for the treatment of cholera by intravenous, subcutaneous or rectal salines according to the urgency indicated in individual cases; by the administration of stimulants, e.g., ether, pituitrin, camphor in oil, adrenalin, brandy, etc. An injection of 40m. of ether often helps to tide the patient over the dangerous period. Glucose and atropine are as a rule added to the intravenous salines. Special attention is also paid to careful dieting and nursing. The diet usually consists of albumin water, rice water, whey, arrowroot congee, glucose solution, etc. Milk, as an article of diet was found unsuitable, and as a rule is withheld during the acute stage of the disease.

Sinapisms and the internal administration of cocaine hydrochloride are resorted to, to relieve vomiting, the latter in 1/8th grain doses in an ounce of water, repeated if necessary. These I found particularly useful. Permanganate drinks are given to quench the thirst and in cases with signs of extensive ulceration of the bowels calcium permanganate bowel washes are cautiously employed. After dealing with acute symptoms and when the circulation is re-established, half to one ounce of castor oil with 10m. of tinct. opii is administered, and later treatment with bismuth, with salol or in mixture with dilute hydrocyanic acid is carried out. In nervous patients, when fright and restlessness are marked, a hypodermic injection of 1/4th grain of morphia with 1/100th gr. of atropine often proves of great value. Treatment with sodium sulphate or magnesium sulphate or a combination of both is not adopted as a routine in cases of gastro-enteritis, as for ordinary bacillary dysentery, for two reasons:—

(1) When there are marked signs of dehydration, further purgation during the acute stage of the disease would certainly lead to disastrous results.

(2) After the abatement of acute symptoms, in the majority of cases all active signs of dysentery generally disappear, and the diarrhoea that continues yields easily to astringents. But in the cases where dysenteric symptoms continue after the first 24 or 48 hours and where the patient's general condition has so improved as to stand further purging, and in mild cases without signs of collapse or dehydration, the judicious use of sodium sulphate is of great value.

Multivalent anti-dysenteric serum prepared at the Lister Institute was tried in a fair number of severe cases, but the results were disappointing. This may be due to the fact that gastro-enteritis in this jail is not a primary acute disease, but an acute exacerbation of a chronic condition with signs of extensive ulceration of the bowels with necrosis, where the value of serum treatment is considered doubtful.

A few selected cases were treated with cresol as suggested by Colonel Palmer in the treatment of cholera and a few others with essential oils. In both these series of cases I noticed that although the character of the stools changed, the diarrhoea continued and had later to be treated with astringents. With the limited number of cases treated perhaps it would be premature for me to form any definite opinion on the merits or otherwise of these treatments.

During convalescence liquor hydrag. perchloridi is ordinarily given for a few days, and later a tonic regime. The return to ordinary diet is very gradual.

Constipation is often troublesome during convalescence, and has to be treated by a morning dose of saline or liquid paraffin at bed time for periods varying from two to three weeks.

ON THE USE OF MERCUROSAL IN SYPHILIS.

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A CONSIDERABLE number of preparations of mercury are now on the market which are stated to be suitable for intravenous injection.

The cost per dose of these preparations is considerably less than that of those containing arsenic compounds. If there is evidence to show that we have a more economical method of effectively treating syphilis and other infections it should be of great practical value.

Messrs. Parke Davis & Co. kindly supplied me with Mercurosol which was used partly by myself and partly by other doctors at my suggestion.

Mercurosol is a synthetic compound of mercury—di-sodium-hydroxy-mercuri-salicyl-oxy-acetate. It is sold in sterile solution ready for intravenous or intramuscular injection.

Altogether 34 intravenous and 12 intramuscular injections were given:—

The following are notes on the cases treated:—

Case No. 1.—Hindu male, age 35 years. Had an indurated and ulcerating hard chancre with clean cut edges on the posterior lip of the prepuce. It appeared 20 days after exposure. *Spirochæta pallida* found in the serous discharge. Four injections of Mercurosol were given intravenously. First dose 1 c.c.; second 2 c.c.; third 4 c.c.; fourth 6 c.c.; with intervals of 2 to 5 days. After the second injection the chancre began to dry up—no discharge; completely healed up after the third injection. No ill effects during the treatment were noticed and further treatment may now be safely undertaken.

Case No. 2.—Hindu male, age 30 years. Had a hard sore, indurated, edges well defined and raised above the surface. No *Spirochæta pallida* found. Had five injections intravenously. First 1 c.c.; second 2 c.c.; third

2.5 c.c.; fourth 3.5 c.c.; fifth 5 c.c. After the first injection the sore began to heal and assumed a coppery colour. After the second injection it healed up, leaving a superficial ulcer which completely healed up after the third injection. Two more injections were given. No ill effects were noticed during the treatment except a small cutaneous eruption at the site of the injections.

Case No. 3.—Hindu male, age 25 years. Had eczematous ulcers on the scrotum and penis, also one suspicious sore on the prepuce. The patient did not give a history of venereal disease. He had four injections intravenously; first 1 c.c.; second 3 c.c.; third 4 c.c.; fourth 6 c.c. Eczematous ulcers and sore healed up completely after the third injection.

While giving the third injection a few drops escaped into the tissues, followed by smarting pain which subsided in half an hour with hot boric fomentations. There was no swelling and severe pain as is met with when neosalvarsan is used.

Case No. 4.—Hindu male, age 35 years. Extensive ulcers on the flexor sides of both forearms. He did not give a history of venereal disease. Duration of ulcers 8 days. He had four injections intravenously. First 2 c.c.; second 3 c.c.; third 5 c.c.; fourth 6 c.c. After the first injection the ulcers which were discharging profusely began to dry and assumed a healthy appearance; after the second injection healthy granulations appeared and the surface became level; after the fourth injection all were completely healed up. No ill effects were noticed during the treatment.

Case No. 5.—Mohammedan male, age 29 years. Pimples on the outer surfaces of the forearms and legs. Complained of much itching. Suffered from syphilis six months ago; a scar on the penis was visible. He had only two injections; first 1.2 c.c.; second 2.5 c.c. After the second injection the pimples faded and there was not so much itching. The patient did not come for further treatment.

Case No. 6.—Hindu male, age 38 years. Had eczema of the scrotum and penis, and often suffers from pain in the joints. He admitted a history of syphilis ten years ago. He had four injections; first 1.5 c.c.; second 3 c.c.; third 4 c.c.; fourth 6 c.c. The eczema cleared up after the second injection, and pain subsided after the fourth injection. No ill effects were noticed during the treatment.

Case No. 7.—European male, age 35 years. History of having suffered from syphilis ten years ago. Present complaint—pain in the joints. He had two injections of N.A.B. fifteen days before Mercurosal was given. Four injections of Mercurosal were given intravenously; first 2 c.c.; second 4.5 c.c.; third 4 c.c.; fourth 6 c.c. The day after the second injection (4.5 c.c.) the patient passed ten to twelve loose motions with mucus and blood; this condition lasted for two days. No other after-effects were noticed.

Case No. 8.—Anglo-Indian male, age 30 years. Suffered from syphilis ten years ago. Present complaint—congestion of throat and apparent thickening of the vocal cords. He had three injections intravenously; first 2 c.c.; second 3.5 c.c.; third 3.5 c.c. After the second injection the thickening of the vocal cords was less and he felt better with his voice. After the third injection his voice was much clearer and the thickening much less. He, like Case No. 7, also passed blood and mucus in his stools (only once) after the second injection (3.5 c.c.); no other after-effects were noticed.

Case No. 9.—Hindu male, age 30 years. Extensive eczematous ulcers on the inner sides of the right thigh. No history of venereal disease. He had four injections intravenously; first 1.2 c.c.; second 3 c.c.; third 5 c.c.; fourth 6 c.c. No improvement in this case was noticed, so the injections were discontinued.

All these cases were treated at the G. I. P. Railway Hospital, Jhansi, and all except one (Case No. 9) were benefited by the treatment. The following two cases were treated by Dr. Sarjoo Prasad, a private medical

practitioner in the city. He is also of opinion that both his cases were much benefited by the treatment.

Case No. 1.—Male, age 29 years. History of syphilis twelve years ago. Present condition—eruptions over the body, especially marked on the palms and soles; throat affected, voice hoarse; tonsils enlarged and difficulty in deglutition. He had six injections intramuscularly. The dose was 0.05 grams for all, given at an interval of five days. The eruptions began to disappear after the second injection, and after the sixth injection all symptoms disappeared. No ill after-effects were noticed.

Case No. 2.—Female, age 20 years. Symptoms:—Ulcer in the soft palate. History of congenital syphilis. She had six injections intramuscularly. After the fourth injection it was found that progress was slow in healing the ulcer, so a dose of 0.3 gm. of N.A.B. was given intravenously. After this two more injections of Mercurosal were given. The patient is improving satisfactorily and is still under treatment.

Recently attention was drawn to the advantage of using similar preparations—mercurochrome and perchloride of mercury—in acute bacterial infections, which opens up the possibility of a very wide field of usefulness.

There is a tendency to diarrhoea which is liable to manifest itself as soon as a moderate dose is given, but it is easily controlled and is often, I think, beneficial. There is a great advantage in Mercurosal, in that it does not irritate the tissues like the arsenic preparations.

In this report the evidence of specific infection was often incomplete, but these notes show that the drug may be safely employed, and that it exerts a reaction on the blood, neutralizing the spirochætal action without damage to the tissues.

REFERENCE.

Dudgeon. Treatment of Acute Bacterial Infections, *Lancet*, Jan. 23rd, 1926, p. 169.

INFANTILE CIRRHOSIS OF THE LIVER. (ITS CAUSATION AND TREATMENT; FROM A STUDY OF 59 CASES.)

By A. S. VAIDYANATH IYER, L.M.P.,

Assistant Surgeon, Tellicherry.

DURING a period of four years from July 1921 to August 1925 I have had occasion to treat the large number of 59 cases of infantile cirrhosis of the liver in its various stages. The onset is slow and gradual and the following signs and symptoms will not fail to attract attention.

An ordinarily active and robust child becomes suddenly dull and sallow; becomes irritable; sleeps badly at night; has night motions (frequently) in the beginning; a low type of fever—in the late evenings and nights only in the early stage, and continuous low fever in the late stages; the child prefers to lie on the bare floor, discarding any covering

on its body; the motions are of different consistency each time; the appetite sometimes voracious and sometimes indifferent; the urine scanty and high coloured; the bowels generally constipated, the faeces being of white or clay colour. The liver enlarges gradually, feels soft in the early stages and becomes hard later; the spleen also gets enlarged in about half the number of cases (in 27 cases in this series), and dropsy and jaundice set in at a late stage. One fatal case had hæmorrhage from the bowels and one case—which recovered—had to be tapped for ascites twice in the course of a year. In one fatal case (not of this series) with severe jaundice, epistaxis and subcutaneous hæmorrhages were seen by me quite recently the day before death.

The tables below show the prevalence of the disease according to age, sex, classes, etc. among these 59 cases.

	Total			
	Males.	Females.	Treated	Cured.
Under 6 months	1	—	1	—
6 months to 1 year	14	11	25	9
1 to 2 years	10	9	19	8
2 to 3 years	8	5	13	8
Above 3 years	—	1	1	1
TOTAL	33	26	59	26

Brahmins (vegetarians)	18
Other caste Hindus (vegetarians)	4
Other Hindus (non-vegetarians)	18
Mohammedans	15
Others (non-vegetarians)	4

Total 59

It is therefore prevalent both among vegetarian and non-vegetarian classes.

Causation.—Syphilis in the parents was traced in 2 cases only. In 4 cases the mothers of the infants had previously lost some children through the same disease. In all the other cases no definite cause could be ascertained. Three cases were among purely breast-fed infants under one year of age, two were on breast milk and Horlick's malted milk only, and all the others were on a mixed diet, i.e., breast milk, cow's milk, rice, sago, etc. Whatever might have been the food, it has been found that faulty digestion is the cause, resulting in the production of toxins in the digestive tract which, on passing through the blood in the liver for filtration, irritate the liver cells. This is evidenced by the fact that a strict diet, limited to the administration of easily digestible food, soon brings about amelioration of all the symptoms, whereas the administration of unrestricted food aggravates the condition even within 2 or 3 days. Early use of starchy foods seems to be another causative factor. I have experimented with this on many children during

the various stages of treatment, and found that the addition of a little rice food to the restricted dietary during improvement soon aggravates the symptoms, whereas the withholding of the same for a few days again brings about the improvement seen previously. But at least five among these cases had not had any starchy food at all, and still had the disease. Perhaps the aggravation of the disease by starchy food is due to overwork thrown upon the young and tender liver, which is unfit to function properly at such a tender age. On the whole, I think, it is only faulty digestion—either due to overfeeding or unsuitable diet—that is the root cause of this malady.

Prognosis.—The earlier the treatment is undertaken, the better is the chance of a cure; and when once improvement in all symptoms is manifest within 2 weeks of treatment, the prognosis is generally, though not always, favourable. The prognosis is more favourable, the older the child is. The appearance of severe œdema and jaundice are unfavourable, but a few cases have recovered after marked œdema or jaundice was present.

Treatment. Diet.—Fresh goat's milk, given warm as soon as it is milked and a little sweetened, has been found by me to be very efficacious, as the percentage of cure among the cases having fresh goat's milk was about 50 per cent higher among those who were not given goat's milk. Ground *ragi* or wheat made into weak *conjee* with or without milk also agrees with the majority of cases. Roasted ripe bananas (available at all seasons in plenty in this part of Malabar) have been found to be excellent in all cases, and especially in cases with obstinate constipation. All fruit juices can be given with advantage. Regulated and timely feeding should be strictly adhered to, and all kinds of indigestible foods carefully avoided. Horlick's malted milk agrees well with many children, in addition to fresh goat's milk. All starchy foods are to be strictly avoided till the liver returns to normal size, and thereafter for at least a month more.

Medicines.—The only drug that has proved successful in my hands up to now is *hydrarg. c. creta* $\frac{1}{2}$ gr. b.d. for babies under one year of age; 1 gr. b.d. between 1 and 2 years; and $1\frac{1}{2}$ gr. b.d. for those over 2 years; combined with *pulvis rhei co.* when constipation is troublesome. These powders I always administer in honey, this being easily swallowed by children. A purgative, castor oil or saline, is to be given once every week or 10 days. Generally within 2 or 3 weeks of this treatment the child becomes brighter and more active, the temperature is lowered or even becomes normal in the early stages, and the liver feels softer. Cases with severe dropsy will call for diuretics and saline purgatives in addition; with jaundice for other cholagogues

such as ammonium chloride, gentian, etc. Such late cases however almost always prove fatal, though 4 cases with marked dropsy, and 2 cases with severe jaundice were among the cured. Of these 59 cases, 3 were so far advanced that they all died within a week of treatment, and 3 could not be traced later. Leaving these 6 cases out, the cure of 26 out of 53 or nearly 50 per cent is really hopeful. The duration of treatment usually lasted from 3 months in mild cases to 18 months in advanced cases. I may also add that a few of my medical friends have also expressed great satisfaction with the results of this treatment by them, though their number of cases is small. Only such cases have been considered by me as "cured" as have been seen by me 6 months after stoppage of all treatment, and after administration of the usual unrestricted food. The powders were continued in all cases for about a month after the commencement of administration of the usual starchy foods.

Lastly, I would earnestly request my fellow brethren in the profession to try this method and report their results from time to time. I am collecting statistics and figures for another series that has been under similar treatment since August 1925 and hope that this further report will be published in due course.

OBSERVATIONS ON THE TREATMENT OF CHOLERA WITH ESSENTIAL OILS, MISTURA PRO-DIARRHŒA, AND PERMANGANATE OF POTASH.

By S. RAJARAM BHARATI L.M.P.,

Medical Officer, Kelakarai (Rannad District).

I WRITE these notes in order to invite the attention of others who have got greater opportunities of treating a large number of cholera cases to try the treatment B below.

and to publish their results, because, if their results are as encouraging as those shown below, then the combined form of treatment (Rogers' and Tomb's) might give better results than that obtained by Sir Leonard Rogers' treatment alone. Out of 32 cases treated during two epidemics of cholera 14 were given treatment A and 18 treatment B. Results are shown in the following table:—

TREATMENT A.

Though the mortality is greater in this group I wish to confine my remarks to certain difficulties which I encountered. In this group of 14 cases, 5 in the algid state and 2 with suppression of urine died. Among these 7 deaths one of the former group and 2 of the latter died, in my opinion, mainly from the rapid accumulation and the consequently rapid absorption of toxins from the bowels because the motions stopped suddenly and the abdomen began to increase in size rapidly, causing very great discomfort to the patients. In one of these 3 cases I gave 6 drachms of magnesium sulphate, and in another I tried to move the bowels by introducing a large rubber tube into the rectum to about 6 inches but both methods were of no avail. None of these cases were given more than 5 to 6 doses of the mixture at 5 minims per dose with one pill every $\frac{1}{4}$ hour interval. Being upset about the unusual results in these 3 cases I questioned the relatives as to whether they had administered any medicine of their own, thinking that it might have contained some opium preparation, to which they replied in the negative. Since the Medical Stores Department does not give the various ingredients and their exact quantities in the pro-diarrhoea mixture and pills in their drug list, I made enquiries as to whether the mixture contained any opium preparation, but could get no definite information. So, it

Treat-ment.	Form of treatment.	Total treated.	Adult men and women.	Children under 10 years.	No. treated in algid stage.	No. treated after sup-pression of urine.	No. given intravenous saline.	Mortality.	Recovery.
A	Mistura Pro-diarrhoea 5 minims every 15 minutes in $\frac{1}{2}$ oz. of aqua with one cholera pill without opium.	14	14	..	7	7	9	50 %	50 %
B	Essential oils mixture 30 to 60 minims in $\frac{1}{2}$ oz. of aqua every $\frac{1}{2}$ hr. and potassium permanganate pills 2 gr. each every 15 minutes.	18	16	2	6	12	6	16.6 %	83.4 %

N.B.—(1) Hypertonic saline was prepared with
(2) Hypodermic injections of atropine $\frac{1}{100}$ gr. were acute stage subsided.

(3) Mistura-pro-diarrhoea and cholera pills without Stores, Madras.

(4) The permanganate pills used are Parke Davis

(5) The essential oils mixture I prepared myself lished in the *Indian Medical Gazette* of June 1925,

Parke Davis and Co. hypertonic tablets, were given morning and evening in all cases till the

opium are as prepared by the Government Medical

and Co.'s 'Enteric pills,' according to the formula of Dr. J. W. Tomb as pub- p. 257.

would be as well if the exact ingredients of the mixture and the pills are published by some authority. Apart from my personal experience, I heard from others that 4 or 5 cholera patients who took the pro-diarrhoea mixture distributed by the Local Union Board also died, mainly on account of the complete stoppage of the motions after taking the mixture. Considering these results I think that the pro-diarrhoea mixture is not a very safe one and that it should not be entrusted to laymen for distribution.

As regards the 9 cases that received intravenous saline in this group of 14 cases, one case was given saline 3 times at intervals of 4 hours, 12 pints of saline in all. Two cases were given saline twice, 7 pints in all. Of these 3 patients the first 2 died. In the remaining 6 cases all required only one injection, of 3 pints of saline, and only one case ended fatally in this series.

TREATMENT B.

I was surprised to note that 8 of the 12 cases with suppression of urine began to pass urine within 3 hours from the commencement of treatment. To the other 4 cases I gave drachm doses of sodium bicarbonate by the mouth in solution every $\frac{1}{2}$ hour, with fomentations in the region of the kidneys. Three of these 4 cases passed urine within 4 hours of commencing the sodium bicarbonate, and only one delayed passage of urine till the 10th hour. None of these 12 cases required intravenous saline. Only the 6 cases in the algid condition required saline and they required only 3 pints each once. Three cases of these 6 were in a collapsed state.

CONCLUSIONS.

The chief points to be noted in the two forms of treatment are:—

(1) The results with pro-diarrhoea mixture are not as encouraging as those obtained with the essential oils mixture. Moreover the pro-diarrhoea mixture in some cases brings on the most undesirable result of completely binding the bowels, the cause of which is not exactly known since the ingredients of the mixture are not published.

(2) Cases that do not react well to the first injection of intravenous saline and require a second injection within 3 to 4 hours of the first, invariably have a bad prognosis.

(3) The effect of sodium bicarbonate either intravenously with the saline or by the mouth is gratifying, as it relieves the suppression of urine.

(4) Cases treated with the essential oils mixture before the onset of the algid stage seldom go on to the stage of requiring intravenous saline.

(5) Generally the pulse becomes normal in volume and strength in the majority of adult patients with 3 to 4 pints of intravenous saline at the first injection.

(6) "Enteric" coated potassium permanganate pills in some bottles of Parke Davis & Co. are not dissolved but are passed with the motions as such. I do not know whether this is due to the pills being too old.

In conclusion I wish to express my thanks to Dr. Nambiyar, the Assistant District Medical Officer, for giving me suggestions when he went through these notes.

A Mirror of Hospital Practice.

A CASE OF BLACKWATER FEVER SUCCESSFULLY TREATED BY INJECTIONS OF QUININE BIHYDROCHLORIDE AND NORMAL HORSE SERUM.

By SURENDRA MOHAN ROY, L.M.P.,

Pukurpar P. O. Pabna.

A HINDU male, named Mahendra Nath Ghosh, aged 25 years, who had lived for some time in the Dooars came under my treatment on the 4th July last. He had then slight fever with an enlarged spleen and liver. On the 8th July at 4 p.m. I visited the patient again. The temperature was then 104°F and pulse 130. The patient had begun to pass blood-stained urine that morning at intervals of 2 to 3 hours, the quantity at each time being 8 to 12 ozs. He was very restless and complained of a burning sensation all over the body and very severe pain, especially in the region of the bladder. The tongue was thickly coated and yellow tinged. The conjunctivæ and upper palate were also yellow tinged. He passed 3 or 4 stools (bloody) during that day and night and began to complain of unbearable pain in the hepatic region.

I gave an injection of quinine bihydrochloride gr. x in the deltoid region and the patient was put on a mixture of cantharides and sodium bicarbonate.

On the morning of the 9th July the condition of the patient seemed to be a little better. The colour of the urine had changed to a light brown colour and that of the stool had also changed. I gave an injection of caffeine-sodium benzoate. The temperature came down to 101°F, pulse 120. In the evening it went up to 103°F. The patient again became restless and began to pass bloody urine frequently. I again gave an injection of quinine bihydrochloride gr. 7½ and normal horse serum (B. W. & Co.) 10 c.c. intraperitoneally in the right flank and another 10 c.c. the next morning in the left flank.

10th July. On further injection of 20 c.c. of normal horse serum the urine became straw-coloured and the temperature came down to 98.4°F. The pulse remained frequent.

The other symptoms, such as the burning sensation all over the body and severe pain in the bladder and hepatic region, diminished a little and the tongue, palate and conjunctivæ became clear.

On the 11th July the temperature came down to normal, the size of the spleen was reduced and all other symptoms also disappeared; but the patient showed signs of suppression of urine. A soft rubber catheter No. 6 was passed at 2 p.m. but no urine was found. I gave an injection of caffeine-sodium benzoate (gr. v.) subcutaneously and urotropine gr. viii orally every 4 hours. The patient passed about 12 ozs. of healthy urine at 3 p.m. and began to pass urine freely.

On the 12th July I gave an injection of quinine bihydrochloride gr. 7½. The patient from that day immediately began to recover. During treatment he was given green coconut water, soda water and fruit juices. On the 4th day he was given a rice diet and is now enjoying sound health.

A CASE OF HÆMATURIA WITH PREGNANCY IN A RETROVERTED UTERUS.

By JAMAL-UD-DIN, M.B.,

MAJOR, I.M.S.,

Dalhousie.

PATIENT X, aged 31, female, multipara, was admitted to hospital complaining of hæmaturia of 10 days' duration. The onset was sudden; no history of pain or frequency of micturition could be obtained. Previous confinements were stated to have been normal.

Family history had no bearing on the case.

On Examination.

The patient had to be supported in by two attendants: she was pale and very debilitated with very prominent hollows about the cheeks.

The various systems were examined systematically and but for the swelling noted below, no sign of note was detected that could account for the hæmaturia.

The abdomen showed an oval swelling the size of a big orange just above the symphysis pubis, fixed, dull on percussion and with just a suspicion of fluctuation: on the whole the swelling appeared to be situated a little too deeply for the bladder.

Catheterisation of the bladder was resorted to and one noticed:—

1. Access to the bladder was rather difficult and the urethra appeared to be elongated.

2. Almost pure red blood poured out from the catheter first. This was followed by almost pure urine.

Bimanual and recto-vaginal examinations were next carried out. The anterior wall of the vagina was very much elongated and the external os uteri was felt high up and with great difficulty. The posterior wall was however bulging forward, was short and the posterior fornix was obliterated. The fundus uteri was not palpable anteriorly. Rectal examination confirmed the existence of a swelling in the pouch of Douglas.

A provisional diagnosis of retroflexed gravid uterus was arrived at and the nature of the malady was explained to the patient and her husband. The patient however was dubious but when closely questioned admitted she had felt as if she was pregnant about a couple of months previously but she said that evidently she was mistaken.

Efforts to replace the uterus on the following day having proved unsuccessful, it was decided to bring on an abortion after consultation with the patient and her husband. A sterilised speculum was introduced into the vagina after it had been douched with Chlorogen lotion. The most prominent portion of the swelling was painted over with tincture of iodine and an ordinary hydrocele trocar introduced into the swelling and about 2 ozs. of clear fluid drawn off. The patient was then returned to bed. The patient felt very much relieved almost immediately afterwards. She aborted 36 hours later and all signs of "hæmaturia" disappeared immediately afterwards.

The patient's suspicion of having been pregnant, was of considerable value in clinching the diagnosis.

INTESTINAL HÆMORRHAGE IN A NEWLY BORN INFANT.

By BHAGWAN SINGH, I.S.M.,

I/C. Kyelang Dispensary, Kangra District.

A SHORT time ago I had occasion to treat a case of intestinal hæmorrhage in a newly born infant, an account of which case may be of interest. A European lady gave birth to a female child on 27th July of this year, and I had the opportunity of attending her during labour. Although it was her first labour the child was born easily with a head presentation, and was well developed. The child's weight on the 6th day after birth was six and three-quarter pounds, and she was quite healthy. About 36 hours after birth, on the morning of the 28th July, I was called in to attend the

child, and she was reported to have passed stools containing blood since midnight. On arrival I found that she was pale in appearance and slightly cold to the touch, in addition to which her pulse was weak and quick. Then her night napkins were examined and they were observed to be stained with dark-green motions. On steeping the napkins in water, the stain changed to red, as well as the water itself.

On my next visit at 4-30 p.m. the same day I found the child still paler and colder, very drowsy, and the pulse still weak and quick. I was informed that she took the breast in the morning, but in the afternoon she showed no inclination to feed. Her napkins were examined again and were seen to be stained with venous blood. In the meantime she continued to pass blood-stained motions frequently, i.e., 8 times in an hour. There was no history of hæmophilia in the parents.

Diagnosis.—From the diagnosis point of view I had to take the following diseases into account.

(1). Hæmorrhage sucked from the mother's cracked nipple; but her breasts were quite normal. Moreover there were no lesions of the child's mouth or nose.

(2). Gastric or duodenal hæmorrhage; but the child did not vomit blood, nor did she show any other symptoms of these diseases.

(3). Invagination of the gut; but neither pain nor tenesmus was evidenced by the child. Moreover she slept well.

(4). External lesions of the anus; there were no lesions.

(5). Vaginal hæmorrhage; this was excluded on examination of the part.

(6). A lesion of the rectum. Finally I washed out the rectum with tepid water containing a little soap, and immediately after expulsion of the water there was another flow of blood. On repetition of this treatment blood again issued, from which I concluded that the hæmorrhage was due to a lesion in the rectum.

Treatment.—At my first visit in the morning I gave Hazeline in two minim doses to the parents, asking them to administer these doses internally to the child at frequent intervals; but until 3 p.m. there was no improvement whatever.

On my next visit, about 4-30 p.m., the infant's condition being worse and hæmorrhage profuse, I plugged the rectum with gauze soaked in a solution of adrenalin (1 : 1000) and ergotin was injected hypodermically in the gluteal region.

On the following morning (29th July) I saw the child again, and was told that she had been able to take nourishment and had also slept well throughout the night. I found that her facial expression was fairly good, no

paleness, the pulse much improved, and respiration quite normal. Then her napkins were examined. The first soiled one contained a little blood together with the stool, but the remainder were free from any trace of blood. Since then the child has progressed favourably. She is still being fed at the mother's breast at regular intervals, and between these periods when she wakes she is given boiled water to drink from a feeding bottle. The child was weighed on the 4th September 1926 and her weight was 8½ lbs.

The case I have cited seems to me to be of special interest as the ætiology of intestinal hæmorrhage in so young a child appears to be most obscure, and it would be helpful if readers of this journal could shed more light on this subject.

A CASE OF HÆMATURIA RELIEVED AFTER REMOVAL OF A CYSTIC TUMOUR OF THE GREAT OMENTUM.

By B. SHANKAR RAU, L.M.S.,

Civil Assistant Surgeon, Chicacole, Ganjam District.

THE following case appears to be worth recording on account of its rarity and the unusual symptoms that accompanied the disease.

Krishnamurti, a peon in a government office at Chicacole, aged about 24 years, consulted me in March 1926 regarding a tumour in the abdomen. He noticed it first in October 1925. It was then about the size of a marble, felt in the left hypochondriac region, painless, and freely movable in the abdomen. The rapid growth of the tumour caused him some anxiety. It had now grown to the size of an orange and was at first mistaken by me for a movable spleen.

Since February 1926 he had been suffering from hæmaturia. He attributed this to his having worked in the Agency Tracts—a very malarious place where blackwater fever is fairly common—where he suffered from an attack of ague. He was treated there with quinine and the fever stopped, but after his return to the plains he got this attack of hæmaturia. He gave no history of any previous attack of hæmaturia, though he had been working off and on in the Agency Tracts, and had very often had attacks of ague.

The blood when examined by me did not show malarial parasites on two separate occasions. The urine was almost pure blood. He had also a mitral systolic bruit in his heart.

I gave him a mixture containing calcium chloride, belladonna, and diuretics. The blood disappeared from the urine after about a

week. He was also put on to milk and barley-water diet. But as soon as he returned to his usual diet and stopped the medicine the blood reappeared in the urine. This time the previous treatment was of no avail. The patient was gradually becoming weaker and very anæmic.

I therefore decided to do a laparotomy and find out if there was any connection between the tumour and the kidney that might lead to this hæmaturia. On the 1st May 1926 the abdomen was opened by means of an incision about one inch to the left of the middle line. The tumour was easily found lying between the layers of the great omentum. The peritoneum was incised and peeled off and the tumour removed. The abdomen was closed as usual.

The tumour was cystic, about 5 inches in diameter, and contained a white milky fluid. The cyst wall was thin and shiny.

The patient made an uneventful recovery and was discharged, cured on the 18th May 1926, i.e. 17 days after operation. Blood was present in the urine for 4 days after operation, large clots being passed in the urine during this time. But on the 5th day the urine became clear and ever since has remained so. The patient is now quite well and doing his duty.

The complete recovery of the patient after removal of the tumour and the absence of hæmaturia leads one to the belief that the tumour might have been a factor in causing the hæmaturia. Osler mentions "renal epistaxis" a condition in which "bleeding takes place from one or both kidneys without any evidence of disease to the naked eye or to the microscope." Manson mentions filarial disease as an occasional cause of hæmaturia. But I have not been able to find microfilariae in the blood of this patient.

I shall be glad if any of the readers of the *Indian Medical Gazette* with greater knowledge and experience of such a condition can throw more light on its causation.

A CASE OF ACUTE GLOSSITIS.

By N. M. DAVE, L.C.P.S.,

Mogalkot, Nadiad.

I WAS called to see a Hindu lady, about 40 years of age at about 5 p.m. one day. I found her sitting on the ground in a corner of the room, supporting the upper part of the body with extended hands placed in front of her against the wall. The neck was thrown back. Her eyes were widely open. The mouth was half

open and between the lips a swollen tongue was protruding, occupying the space fully. She was not able to drink or speak. Saliva was dribbling from her lips. The respirations were very shallow. The temperature was 105.8° F, and the upper and anterior part of the neck was hot, swollen and painful.

Her history, as given by her husband, was as follows:—Six days previously in the morning she was eating with her daughter a *melat chapati* prepared the previous evening by herself. While eating she felt some pricking sensation when swallowing the morsel, which she could not eject as it was beyond control. A few minutes later there was vomiting. The next day she felt some pain in eating. The trouble increased in spite of ordinary treatment given by a compounder-practitioner. The bowels were constipated.

I saw her on the 7th day of illness. The following treatment was given. A soap enema was given, and was repeated, and a mixture containing magnesium sulphate, sodium salicylate, and cardiac stimulants given. Locally, leeches were applied below the lower jaw and hot magnesium sulphate compresses for half an hour. Then ichthyol and belladonna was painted over the part; and hot fomentations continuously applied. After 2 days' treatment she was able to take liquid food. She had completely recovered a week later.

THE EFFECT OF PROLONGED APPLICATION OF COLD ON THE EYE.

By Dr. K. E. MADAN, M.D., D.O.M.S.,

Honorary Ophthalmic Surgeon, Parsee General Hospital, Bombay.

AN old lady of about 55 years was slightly hit accidentally with an apple on her left eye, resulting in a severe sub-conjunctival ecchymosis.

This lady had myopia of a fairly high degree and has been wearing glasses, - 8 D. sph. c - 2.5 cyl, prescribed by me some time ago. After this accident she consulted a general practitioner who advised her to keep an ice-bag continuously over her injured eye. This the patient did, and as the ecchymosis did not clear up as quickly as expected, her doctor unfortunately advised her to continue the application of the ice-bag, and so according to the patient she had the ice-bag on her eye for the unusually long period of nearly thirteen days, during which time she remained in bed.

When I was called to see her at this time, her eye was in a state of acute glaucoma, with increased tension (T + 2), hazy cornea,

shallow anterior chamber; dilated and immobile pupil, and central vision as well as the field of vision were greatly diminished. She complained of violent headache, and pain in the eye-ball; in addition to this, she was suffering from supra-orbital neuralgia on account of the ice-bag lying over her forehead and over the course of the supra-orbital nerve; also she had some oedema of the upper lid, and slight ptosis, indicating paresis of the third nerve.

As she refused an immediate operation for the glaucoma, I blistered her left temple, and eserine was frequently instilled, fomentations ordered, and morphia injected, and she was put on bromides, gelsemium, hyoscyamus, and salicylate mixture. The next day she consented to operation, and I trephined her; she had a quick uneventful recovery, and the ptosis gradually disappeared.

The points of interest of this case are:—

1. That the continued application of cold on the eye leads to congestion, and contracts the canal of Schlemm and the minute crypts on the surface of the iris, which are the natural passages for the circulation of the aqueous humour, and thereby results in settling up congestive glaucoma in the eye.

2. That in the above case, glaucoma was caused by the prolonged application of cold, and not by the trauma itself, for the trauma was very trivial, and it did not cause any lens dislocation or any intra-ocular hæmorrhage, which are the causes of traumatic glaucoma.

3. That sub-conjunctival ecchymosis when severe, although frightening in appearance, is not at all a dangerous thing if unaccompanied by any other intra-ocular complication, e.g. retinal hæmorrhages, detachment, etc.; and it always takes a few days, sometimes several weeks to clear up, and while it clears up it passes through varying shades of brown, green, and yellow until the sclerotic again becomes white as before. In some cases the effused blood completely hides the sclerotic, and may even find its way for a short distance into the substance of the cornea. It must be borne in mind that when sub-conjunctival ecchymosis occurs immediately after an injury it is of very little significance, but if after a lapse of several days, its prognosis is very serious, because it is then one of the most trustworthy indications of fracture through the anterior fossa of the skull, and may be followed by death.

4. That acute congestive glaucoma in this case occurred in an eye with myopia of as much as 8 D; this is peculiar to this case, as glaucoma is uncommon in myopes, and certainly very rare in myopes of as much as 8 dioptries.

5. That trephining in acute cases, after preliminary reduction of tension as much as possible by eserine instillations, gives as

satisfactory results as the old operation of iridectomy.

A CASE OF WANDERING SPLEEN—SPLENECTOMY.

By J. B. VAIDYA,

MAJOR, I.M.S.,

District Medical Officer, Kurnool.

A MARRIED woman, aged about 35, was admitted for an enlarged floating spleen and prolapse of the uterus.

The patient had had six pregnancies. Seven years ago, during her 5th pregnancy, she had twins. The first child, a boy, was born naturally with the head presenting. Noticing that the placenta had not come out after the birth of the first child, various measures were tried by her relatives and friends, amongst others manipulations of the abdomen and tying a rope to the abdomen and pressing the uterus down. As a result, the legs of the second child presented and it was extracted. The placenta was then removed. There was no rise of temperature, but the patient noticed a slight prolapse of the uterus, which gradually increased. She also noticed soon after delivery a tumour in the lower abdomen of



about the size of an orange. About 2 years ago she had irregular fever for about a month. Menses regular. There was no history of specific disease.

Condition on Admission.—Complete prolapse of the spleen was present. There was a tumour occupying the lower part of the abdomen, filling the left iliac and hypogastric regions. It could be moved freely, was dull on percussion, hard, and a notch could be felt at one margin. The differential blood count was:—

	Per cent.
Polymorphonuclears	.. 52.5
Eosinophiles	.. 13.0
Lymphocytes	.. 29.5
Transitional	.. 5.0

No malarial parasites were discovered. Enlarged floating spleen was diagnosed.

Operation.—The abdomen was opened in the middle line and the spleen brought out and removed, after ligating the pedicle in 3 separate parts by transfixion ligatures. A ligature was also transfixed and tied round

the whole of the pedicle. The peritoneum was sutured over the stump and the abdomen closed by through and through sutures. The patient made an uneventful recovery. The spleen was unfortunately not weighed and measured immediately after removal. But after preservation in spirit it weighed 21 ozs. and had the following measurements:—length in long axis, 8 inches; breadth 5 inches.

A CASE OF PERINEAL EXCISION OF ANO-RECTAL CANCER.

By S. C. DAS GUPTA, L.M.S. (Cal.).

Senior Surgeon, Bir Hospital, Katmandu, Nepal.

A NEPALESE woman, multipara, aged 46, was admitted to the Bir Hospital for the treatment of cancer of the rectum.

Previous History.—The patient could not give any precise date of onset. There was no family history of importance. About 2 years ago she began having slight diarrhoea alternating with constipation; subsequently pain in the anus, especially during the act of defaecation; and lately foul-smelling, thin reddish-brown coloured discharge, sometimes mixed with mucus or pus, and occasional hæmorrhage. She was treated for a long time for piles and dysentery, but with no effect. She ultimately came for admission on account of partial obstruction.

Condition on Admission.—Patient was weak and emaciated, had constant pain and a very poor appetite. On examination the perineal skin was found involved, the mucous membrane was ulcerated, hard and having a "shell-like elevation"—as De Quervain defines it—to the touch, with a firm border and the friable easily bleeding surface so characteristic of cancer. I felt lymphatic nodules of varying sizes through the rectum on pressing against the sacrum; higher up, the canal would not even admit the tip of the index finger. Combined vaginal and rectal examination showed hard induration on the posterior wall of the vagina and its adhesion to the rectum. Examination with a proctoscope lighted from a battery brought into view the growth with an ulcerated base. The microscopic appearance resembled that of an adeno-carcinoma.

Preparation of the Patient.—Five days before operation 15 grs. of calcium lactate was given 3 times a day for three days, the rectum was washed out daily with boric lotion ($\frac{1}{2}$ oz. to a pint) in the morning. Strychnine hydrochloride $1\frac{1}{100}$ gr. was injected once every day for 5 days preceding operation and 3 days after it. Three days before operation I gave the patient a warm bath and started rectal injection of calcium lactate $\frac{1}{2}$ dr. with 2 ozs. of water in the afternoon, and anti-chloroform mixture* by the mouth 3 times a day. On the day before operation castor oil was given 2 hours after the morning meal and a soap enema at 3 p.m., followed by a rectal injection of 10 ozs. of a 2 per cent. ichthyol solution in the evening. Mummy's catechu mixture containing 10 minims of tincture of opium was given at bed time. Milk and sago was only allowed at night, and no solid food. Half an hour before operation omnopon $1\frac{1}{6}$ gr. with scopolamine $1\frac{1}{150}$ gr. was injected subcutaneously.

Operation.—The patient was anaesthetised with chloroform, and when 'under,' the anaesthesia was kept up by C. E. mixture from an open mask with the mouth 'propped open.' Simultaneously saline injection under the skin of the chest was started and kept up during the whole period of operation at the rate of 1 pint per hour. Then the patient was placed in the lithotomy position, the bladder was emptied, and the vagina and rectum were scrubbed with gauze and washed out with

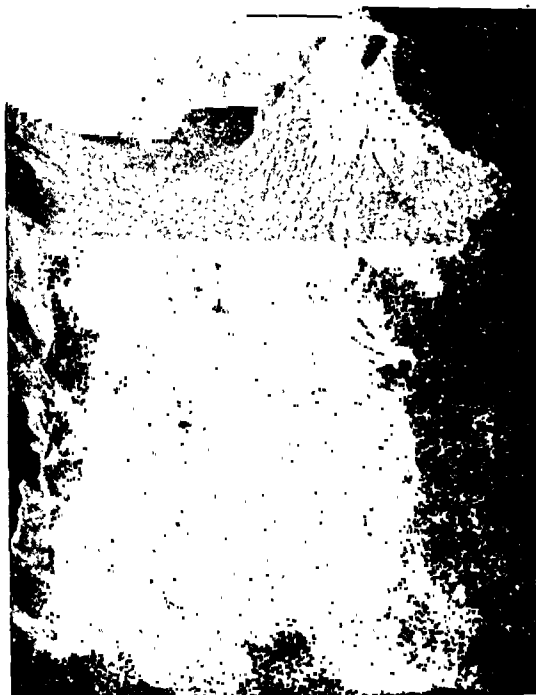
lysol solution, after which the buttocks, were elevated on a small flat pillow, covered by a sterilized cloth and projecting beyond the edge of the table. Both vagina and rectum were packed with sterilized gauze without exerting any pressure on their walls. Next, I injected novocaine solution (1 per cent.) around the margin of the anus in order to 'block the nerves' and lessen the amount of shock. Then the anus was closed with stout silk by a purse-string suture. An incision was made surrounding the anus about an inch away from the orifice outside the suture, which was carried forward up to the perineum and backward nearly to the coccygeal tip. The severed skin together with the anus being held by a pair of tissue forceps with the left hand, I proceeded with the dissection. I began on the posterior part first, divided the external sphincter muscles, and then the levator ani and lateral ligaments were freed to some extent above and severed close to the rectum with scissors curved on the flat from above downwards "following the hooking up of the muscle with the index finger" (Gant). The posterior rectal space was opened by the gauze-covered finger and curved scissors and the ischio-rectal fat removed. Then with my finger I defined the extent of infiltration and determined how far beyond the growth I should remove the tissues. Bleeding was controlled by the introduction of hot gauze packs into the space as tightly as possible. Next, I turned to the separation on the anterior aspect and deepened the original incision made in front and at the sides of the anus, divided the sphincter ani behind the transverse perineal septum and also the recto-vaginal band, (Pauchet); then pulled down the rectum and separated it from the posterior wall of the vagina up to near Douglas' pouch mostly by blunt dissection with curved scissors, the handle of a scalpel or gauze compress and occasional division with the knife at places where force was unjustifiable. At this juncture the anal margin gave way, so I had to cover the end of the rectum with a piece of gauze like a cap and apply a gauze bandage around it in order to prevent leakage and help in the act of traction during dissection. Again I went back to the posterior wound and detached the rectum with indurated cellular tissue around the rectum and also all affected ano-rectal and prevertebral glands, mainly in one piece from the hollow of the sacrum to the promontory with blunt scissors and a compress mounted on forceps, and then worked on to the anterior aspect from the sides. In the course of this some arteries were secured and divided between clamps, the most important being the middle and inferior hæmorrhoidal arteries situated more laterally than anteriorly. The vagina though dissected carefully was buttonholed at places on account of hard and nearly cartilaginous indurations breaking down. I removed all the affected tissues and stitched the posterior vaginal wall with chromatised sutures through the vagina. Now the rectum having been pulled down with the left hand, the peritoneum was stripped upward with the right hand for about an inch or so in order to "loosen the bowel higher up" and then Douglas' pouch was opened in front, and the attachments of the peritoneum also divided—first on one side and then on the other, keeping close to the rectum, and the margins of the opening held securely by peritoneal forceps. Then the meso-rectum and sigmoid mesentery were severed as close to the sacrum as possible permitting thus further "lowering of the recto-colic segment" (Pauchet); and in the course of this the superior hæmorrhoidal artery and branches of the superior mesenteric artery were secured. In this way the diseased rectum was brought down below the anal margin. Then the wound on the anterior aspect being opened with retractors, the cut margins of the peritoneum were carefully stitched "all round to the sides and front of the sigmoid" to restore the peritoneal floor (Mummy). Then the fibres of the levator ani were brought in apposition on either side of the rectum, the opening narrowed as far as possible, and the edges of the muscle were stitched about the bowel, by way of support to the rectum. Finally, the extruded gut was held between 2 clamp forceps—of which the blades of the proximal one were protected by rubber tubing—

* Vide "The Antiseptic," April 1926. 'Technique of Modern Surgery. By the writer.

beyond the anal margin, about 2 inches above the cancerous growth and the rectum was amputated with the thermo-cautery. Then the perineal wound was narrowed by silkworm gut sutures to the sides of the newly made rectum; sterilized vaselined gauze was introduced between the rectum and sacrum, and in the recto-vaginal space, i.e., both in front and behind the rectum. The

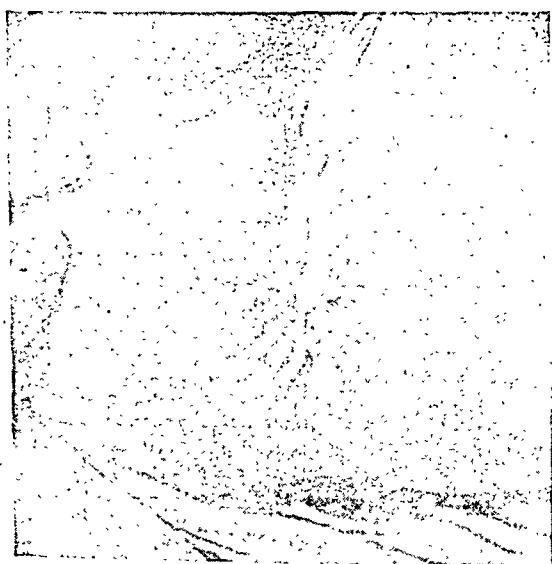
Rectal saline with 5 per cent. glucose was administered by the 'drop method' for about 8 hours, and stopped when reaction set in and the pulse became steady. There was no bleeding, and the highest temperature my patient had was 101°F. on the evening of the 2nd day; it dropped to 97°F. on the 6th day. I started 10 per cent. glucose water by the mouth on the 2nd

Cancer of Rectum—Upper Border.



Anal Border.

clamp was removed and the end of the gut was cleaned and stitched to the peri-anal skin all round, leaving space for the drainage only. A rubber tube ($\frac{1}{2}$ in. in diameter) was inserted into the rectum for about 2 inches and the outer end secured by a safety-pin. The



Dorsal.

vagina was swabbed out and packed with sterile gauze, and the whole wound painted with iodine and benzoin and dressed and a T-bandage applied firmly.

After-Treatment.—The patient was placed in Fowler's position. Nothing was given by the mouth for 6 hours, after which only sips of hot water were allowed.

day, which she took and retained very well. On the 4th day I gave castor oil which was followed by warm olive oil and a soap enema through the rectal tube; the same evening I started milk and barley-water. Three days after she took soft rice and soup. She was given ordinary food in small quantity from the 9th day. The stitches were removed on the 10th day. During this time I had the patient's bladder relieved 3 times a day.

The only complications she had were bronchitis and suppuration of the retro-rectal space. Fortunately the wound of the retro-vaginal space healed by first intention. Her cough was relieved by half a drachm of tinct. camph. co. and spirit ammon. aromat. with an ounce of warm water given 3 times a day; brandy was freely given both as a stimulant and food. The wound became healthy after irrigation through a rubber tube with hydrogen peroxide and biniodide lotion for several days. As long as the discharge was profuse and purulent a rubber drainage tube was left in. Finally, after removal of the tube, injection of B. I. P. P. was carried out and the wound healed completely very soon. As long as she was in the hospital she had very little control over her bowels. I saw her lately, about 3 months after her leaving hospital; she had gained as much as 10 lbs. in weight and there was only partial incontinence of faeces left.

Notes.—Posteriorly there are almost no arteries or structures of importance; while anteriorly and laterally we have to be very careful; dissection in these areas with sharp instruments is very dangerous. The best way to deal with vessels is to divide them between 2 clamps or ligatures as close to the rectum as possible. There are nearly always large vessels caught in the clamps and every one must be tied. The meso-sigmoid and meso-rectum should be cut close to the sacrum. Anteriorly always keep your knife close to the rectum to avoid wounding the seminal ducts, prostate, ureters, bladder, etc. in the male, and vagina, etc. in the female.

In order to avoid recurrence at least some 2 inches of the rectum above the growth should be removed; in advanced cases this is insufficient (Carson). There should not be the least strain or tension on the rectum; for tension always means sloughing. In order to relieve tension, either lengthen the bowel by bringing down the sigmoid or transplant the anus high above the original situation by removal of the coccyx or of a portion of the sacrum. The bowel should not be divided far away from the edge of the mesentery as the part without a mesentery—on account of deficient blood supply—is apt to slough; any length above 2 inches is very risky. Too much eversion of the rectal mucous membrane is to be condemned. Lastly, the bowels should be kept acting regularly with some mild laxative and constipation or straining should be guarded against.

Two photos are given; one is of the part of the rectum removed and kept in formalin, of which the edges are irregularly shrunken and the raised border of the growth is clearly seen; the other is of the patient showing the anus healed up.

TWO CASES OF ACUTE ENCEPHALITIS LETHARGICA.

By DR. GRACE STAPLETON, M.D., B.S. (Lond.).

Lady Superintendent, Dufferin Hospital, Calcutta.

As the subject of encephalitis lethargica has been much discussed recently in medical circles in Europe, but very little mention of the disease has been made up to now in the Indian papers, the following report of two acute cases which have lately occurred in Calcutta is given in the hope that it may evoke discussion and lead others to report similar cases, so that some estimate can be formed of the extent to which the disease has now spread in this country. It is probable that many cases are occurring but are seldom recognised in the acute stage, as the symptoms may be misleading. Others may be finding their way to the ophthalmic clinics owing to the frequency of eye symptoms in the prodromal stages.

Case 1.—Ganesha, aged 14, Hindu female, was seen on the 3rd July 1926, owing to retention of urine of 2 days' duration. She had been in good health until 2 months previously when she had been brought from her father's home in Ballia, in the U. P. to Calcutta for treatment of corneal ulceration in the right eye. Since then she had been under regular treatment by an eye specialist with marked improvement. There was no history of diplopia or squint. Her husband's relatives thought she had been rather dull all this time, and she was said to be in the habit of passing urine only 2 or 3 times a day.

On 30th June she was taken ill with moderate fever and marked drowsiness. On 1st July she had difficulty in passing urine, and the next evening a catheter had to be used, as no urine had been passed for 24 hours.

When seen on the evening of the 3rd, she was lying in a heavy drowsy state but could be roused and would open her eyes and try to reply to questions slowly, though she required prompting. She was a well-grown girl with a good colour. There was photophobia in the right eye and a considerable leucoma. There was marked tetany in the hands at intervals with a little pain. She had no headache but agreed that there was some pain in the middle of the abdomen when a relative reminded her of it. There was a fine papular rash like prickly heat on the face, most marked on the forehead and less on the forearms, which was reported to have come out with the fever a few days before.

The pulse was slow and regular. The skin felt a little warm but the temperature was not taken. Examination of the heart, lungs, and abdomen gave negative results. On vaginal examination, nothing abnormal could be discovered to account for the retention of urine. She was then menstruating. Repeated attempts to persuade her to pass urine failed, although she sat up in bed, and even tried on the bed-pan on the floor. During this time she sat as if half asleep supported by relatives and kept asking to be allowed to lie down, but seemed unable to concentrate her mind and make enough effort to pass urine. In the end a catheter was passed and about 10 ounces of clear deep-coloured urine withdrawn.

4th July.—The patient was seen again 12 hours later. She was reported to have had a restless night up to 2 a.m. and retched after the medicine, but slept later. No more urine had been passed. She was still in the same lethargic condition. The knee-jerks were doubtful, and the Babinski sign negative. Temperature 100.4°F., pulse 88. The relatives were advised to bring her to hospital, and she was admitted at 4.30 p.m. She could swallow well. An enema gave a constipated result but still no urine came away. Blood test for malaria, negative result.

5th July.—The patient was restless and cried out for 2 hours in the night, but slept later. She passed a stool in bed. Early in the morning a deep scarlatiniform rash was seen on the body and by 8.30 a.m. it had covered the whole patient including the legs, but the face had a spotty look owing to the previous rash. Tongue furred. Mental state as before. As no urine had been passed for 36 hours, it was withdrawn by a catheter and two-thirds filled a large kidney dish. No albumen or sugar was found in it. When roused, the patient complained of a little giddiness and abdominal pain, but only if pressed or prompted. Temperature 99.4°–100.6°. Pulse 84–86.

6th July.—Patient was very restless in the night, calling out and throwing herself about repeatedly from 11 p.m. to dawn, and then relapsing into a lethargic state which was deeper than before, as she could hardly be persuaded to open her eyes or put out her tongue, even when spoken to loudly and the eyelids opened forcibly. She fell asleep again after saying 2 or 3 words. Temperature 100°–101°. Pulse 76–84. Bowels opened with enema. Catheter passed b.d.

8th July.—Patient no better, but temperature lower, i.e., 98.4°–99.2°F. She slept all day without moving, but woke up in the evening, looked round a little, and later became very restless and noisy and slept not more than 1 to 1½ hours after Mist. Pot. Brom. and Chloral, grs. xx of each. She could swallow well when fluids were put to her mouth. The arms and legs and, to a less extent, the whole trunk were found covered with a deep purplish mottled rash which did not fade on pressure. A little twitching of the hands was noticed when she was asleep. Sometimes tetany occurred in both hands and feet.

9th July.—Definite improvement. Patient less drowsy and more observant, and complained of hunger. Had a better night on the whole, though slept very little. Knee-jerks absent. Abdominal reflexes active. Seen by Major Hingston, F.R.S., who confirmed the diagnosis of encephalitis lethargica in the acute stage. The patient passed urine normally for the first time for 8 days, and then slept well after Medinal, grs. vii.

10th July.—State unaltered, but patient passed urine twice alone. She complained of pain over the left temple. Conjunctivæ of both eyes congested in the day time after she had been sleeping, but clear in the evening. Temperature 98.4°–99.6°. Pulse 80–86.

17th July.—Marked improvement. Patient much less drowsy and could sit up in bed alone, but complained of giddiness when she tried to put her feet to the ground. Sleeping well at night without Medinal. She could feed herself and could smile. No tetany recently. Rash fading. Temperature normal since 14th.

20th July.—Improvement continued. Patient still sleeping too much in the day as well as all night, but could answer questions intelligently, though slowly and

briefly. Could walk slowly across the room unaided. No stiffness of gait. Going herself to the bath-room and had full sphincter control. Nutrition good. Purple rash still present on forearms and dorsum of feet, but almost faded from the rest of the body. Skin peeling from all finger tips and part of the feet, like desquamation after scarlet fever. Some complaint of pain in the knees.

22nd July.—Patient much brighter, smiling readily, not drowsy. Relatives considered her practically normal, and wished to take her away to the country in a few days' time. She could get up alone and dress herself, but was very quiet and slow compared with a normal girl.

23rd July.—Left hospital.

30th July.—Reported to be very well; considered quite normal by the family.

Case 2.—Kemolini, aged 9, was admitted on the same date, 4th July 1926, for fever and drowsiness of one week's duration. She had lived in different orphanages to the north of Calcutta for several years, and 3 months before had been transferred to an industrial school as she appeared too slow to profit by ordinary lessons. There it was found that her sight was defective and she could only see enough to get about and wind balls of wool. She attended an oculist who said that the defective vision was due to poor general health. No squint was noticed. No complaint of diplopia. In other ways she appeared normal.

On examination on 5th July she was found lying in a semi-comatose state, with total incontinence of urine and faeces. If the eyelids were raised the pupils rolled upwards. If spoken to loudly and touched she occasionally responded and spoke a word or two, but when left alone she remained quite still and never asked for anything spontaneously. Nutrition poor. No head retraction or rigidity of legs. Temperature 102°, pulse rapid and low tension. Patient could swallow a little, tongue furred but moist.

Lungs	{	No appreciable disease.	Knee-jerks, doubtful.
Heart			No Babinski reflex.
Abdomen			No rash. No nocturnal restlessness.

8th July.—Condition worse. Patient could hardly swallow. Diarrhoea present. Temperature 99°—101°. Pulse 160. Patient lying in a comatose condition all the time.

9th July.—Diarrhoea less. Patient opening her eyes more but did not speak. Lumbar puncture done and clear fluid withdrawn at normal pressure. No abnormal constituents found. Temperature 98°—100°. Pulse very rapid. Muscles slow to relax when tongue put out.

13th July.—Child still very drowsy. She sometimes lay with her eyes half open, vacantly staring. Temperature normal. Diarrhoea stopped. Very little food taken. Replied sometimes when spoken to firmly.

20th July.—Child better on the whole. No incontinence the last few days, and she could ask for the bed-pan. Bowels constipated. She still slept most of the day. Temperature irregular, some days 99° and below, other days up to 100.4° and 101.6°. Some complaint of pain round about umbilicus. Child very thin.

23rd July.—Right ear discharging pus, but no pain or tenderness.

27th July.—Child considerably less drowsy but still heavy and talked very little. No discharge from right ear, but a little pus seen in left ear. Temperature still irregular. No knee-jerks obtained.

2nd August.—Child much brighter. Answered questions intelligently, and was seen to smile. Temperature normal. No discharge from ears. Still no knee-jerks.

12th August.—Talking like a normal child to next patient for past week. No longer drowsy, but very thin and weak. She could just stand holding on to furniture,

but still almost too weak to sit up for more than a few minutes without support or to lie down by herself quickly.

23rd August.—Child bright and smiling. Walking well but still a little weak. Knee-jerks returned. Sight good and she can read print easily.

26th August.—Discharged well. Nutrition still very poor but improving daily.

After these notes were completed, a 3rd case in the chronic stage was seen in the out-door department. She was a woman of about 30, who showed the Parkinsonian syndrome of 1½ years' duration, following an attack of obscure fever and general illness which lasted a month, 6 months previously.

A CASE OF CEREBRAL MALARIA, PRESENTING UNUSUAL FEATURES.

By A. BAYLEY-DE CASTRO,

Junior Medical Officer, Haddo, Port Blair.

IN the *Indian Medical Gazette* for June 1926, K. C. Bannerjee of the Leesh River Tea Company published an article entitled "An Interesting Case of Malaria," and I am of the opinion that the publication of such cases helps to keep fresh in the minds of medical practitioners the vagaries of malaria.

In this settlement of the Andamans we every now and then meet with rare, irregular, and interesting forms of malaria, and when you get such a case without the presence of other infections, it becomes doubly interesting, as I hope the notes below will show.

Case.—Prisoner No. 45798, a young man of average height and fair build, but slightly under weight, and of poor muscular development, reported sick on the morning of the 12th April 1926, stating that he had had fever for 3 days with slight rigors, and vomiting, followed by profuse diaphoresis. His previous admissions to hospital were for diarrhoea once, for bacillary dysentery once, for benign tertian malaria once.

Palpation revealed a tender spleen enlarged to 1 inch beyond the costal margin. The liver was normal, circulatory and respiratory systems normal, urine of specific gravity 1024, dark in colour, and loaded with phosphates.

Blood examination elicited a moderately heavy infection with *Plasmodium vivax*. He was given a preliminary purgative and put on the alkaline and quinine treatment.

I must now ask my readers to carefully study the temperature chart, while following the progress of the case.

Nothing of any interest happened till the 16th April when the patient at 9 a.m. had a short, sharp rigor with a rise of temperature to 102°F. He complained of severe headache, and had a very flushed face. There was also a slight cough but nothing was detected in the lungs.

On the 18th April the temperature was still rising and it was apparent that the influence of quinine was lost. The pulse, it was noticed was slow in proportion to the range of temperature. Constipation was marked and headache was persistent.

Blood was taken for a Widal reaction, and a smear for a differential leucocyte count, the results of which were as follows:—

B. typhosus + 1 in 20. Negative for everything else, and at all other dilutions. Polymorphonuclears 60 per cent., large mononuclears 14 per cent., lymphocytes 35 per cent., eosinophiles 1 per cent. At the same time the possibility of an infection with the *Bacillus fecalis alkaligenes* was not forgotten.

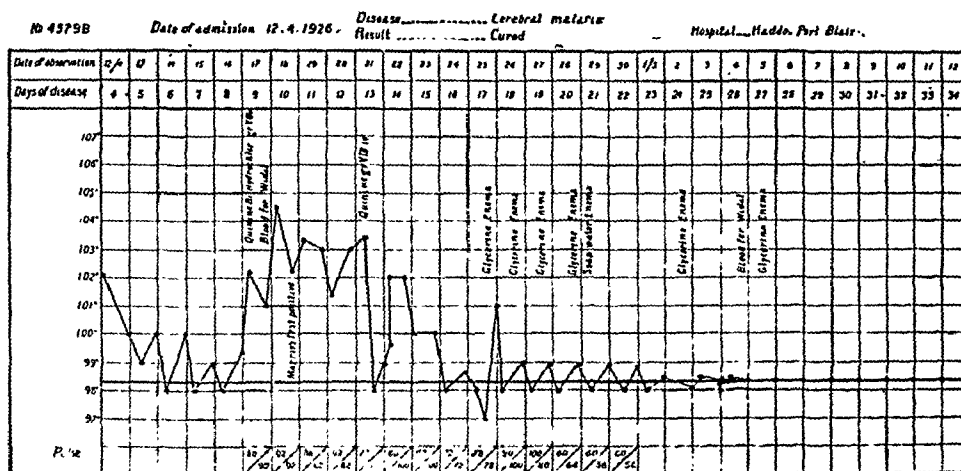
The spleen was still enlarged and tender, the face flushed, the lips and tongue dry.

At 10 a.m. on 21st April the patient suddenly became violently delirious. The lungs were carefully examined, especially the apices, but were found to be free from pneumonia. At 12 noon there was a sudden drop of temperature to 97.4°, the patient was bathed in a cold clammy perspiration, and acute pulmonary oedema supervened; both lungs being full of moist râles and crepitations. The delirium was now replaced by unconsciousness, and the patient was in *extremis*. Tracheal râles were audible, respiration 32 per minute and of stertorous type, and pulse 88 per minute, small in volume.

patient was originally on, a fresh lot of parasites had matured, and were potent enough to cause the grave symptoms noted in this case. I was not able to find a double malarial infection, and it is known that the benign tertian parasite sporulates in the peripheral circulation, while the malignant tertian parasite does so in the deeper tissues and organs.

Thus if the causative organism was not a benign tertian parasite it is possible that the batch of organisms to mature and sporulate between the 16th and 21st were malignant tertian ones which had not been killed by the quinine administered hitherto.

Judging from the severity of the case a reaction of 1:20 to *B. typhosus* must take a very minor place in the consideration of the



I did not resort to venesection as the patient was extremely low and I expected death at any moment.

Jacket linseed meal poultices to encircle the chest and back were ordered, and I left the ward.

At 1-30 p.m. my sub-assistant surgeon had written on the case sheet "patient dying." At 5-30 p.m. there was a most marvellous change, the laboured breathing had been replaced by normal respirations, the tracheal râles had gone, and the temperature started to rise. There was complete relaxation of all muscles, and loss of all reflexes.

24th April.—A diffuse urticarial rash appeared all over the body which disappeared on the 26th, on which date it was also noticed that the lungs were practically clear.

28th April.—Bowels still very constipated. This morning for the first time since the 21st when shouted at he was partially roused. Reflexes were still lost, and the temperature had been normal since the 25th.

30th April.—Spoke for the first time this morning since unconsciousness began, and asked for food.

The spleen by now had completely receded, and the reflexes started to show themselves.

There is nothing further to record. Treatment was symptomatic, but quinine was not withheld.

Twice during the unconscious period the blood was examined for parasites but with the exception of swollen red blood corpuscles and a large mononuclear count of 14 per cent. at the first examination, nothing of interest was found.

Amyl nitrate inhalation was given prior to the 2 intravenous injections of quinine, and followed later by an injection of pituitrin.

In this case the question arises whether in spite of the ordinary quinine mixture that the

case. At one time I felt like attributing significance to the slow pulse, headache, and constipation, but I have twice met the patient since his discharge from the post-malaria gang and on both occasions found that his pulse is a naturally slow one (68 to 70 per minute); yet it is worthy of note that even when in an hyperpyrexial condition the pulse remained slow and out of proportion to the range of temperature. The violent maniacal delirium followed by unconsciousness in a few hours, and the sudden pulmonary oedema are also points of interest in the case.

Editorial Note.—In the absence of malarial parasites during the attack, it does not seem justifiable to assume that malarial infection was the cause of the symptoms. The chart is suggestive of Dengue which sometimes shows cerebral symptoms.

ERRATUM.

On p. 288 of our issue for last June, in the paper on "Some Cases of Asthma" by G. Raghunatha Rao, L.M.P., at the end of the first paragraph for "Now it is obvious that he was sympathetico-tonic" please read "Now it is obvious that he was not sympathetico-tonic, but was vago-tonic."—Editor, I.M.G.

Indian Medical Gazette.

DECEMBER.

CASE HISTORIES.

THERE is one feature in general hospital work in India which perhaps more than any other is unsatisfactory. We refer to case records. The amount of clinical material in every large hospital in this country is almost unlimited. Exceptionally interesting cases are admitted daily on either the medical or surgical side, treated, perhaps operated on, and discharged—often indeed discharged before the patient should have left hospital, owing to the unwillingness of the average Indian patient to stay in hospital.

Yet the output of clinical papers of merit is entirely unsatisfactory. Here and there a well-known physician, surgeon, obstetrician or ophthalmologist takes the trouble to keep careful records of his cases, to follow them up, to tabulate, card index, and annotate; finally to write up the subject upon an adequate basis of observed fact. And when he does so, the clinical report which results is usually one of universal interest with an appeal to a wide circle of readers, and of special applicability to Indian conditions. On the whole, however, the men who are competent to do so rarely enter the field of medical journalism in India.

Why? It is a problem that has forced itself upon our attention now for some years. There are or may be a dozen good reasons, but of special importance, we think, is the utterly inadequate method of recording case histories adopted in most hospitals in India. In saying this, we do not wish for a moment to make any reflection upon the many—and many of them excellent—resident house physicians and surgeons in the large hospitals in India. One of the reasons for the utter want of decent records is probably the inferior quality of the stationery supplied to official institutions; no business firm would tolerate for a moment the inadequate and inferior stationery supplied to Indian hospitals. Not a day passes without visible evidence of it coming under our notice; the unfortunate assistant or sub-assistant surgeon has to put up with stationery which not even the local *bumia* would probably condescend to use. We do not suggest that embossed and highly polished note-paper such as is used in "the seats of the mighty" should be substituted; but we cannot refrain from suggesting that there is room for very considerable improvement.

A second cause, however, is almost certainly the complete want of system and method in the majority of hospitals in India in such

matters. A few pioneers such as Lt.-Col. C. C. Murison, I.M.S., Civil Surgeon of Belgaum have realised this; whilst it is a matter which has received special attention at the Carmichael Hospital for Tropical Diseases in connection with the Calcutta School of Tropical Medicine. Yet, for the most part, the records are taken upon no systematic basis. If information has to be collected, it has to be literally "dug for" through piles of dog-eared, tattered and torn manuscripts written on paper of the worst possible quality.

The matter may seem to be a trifling one, yet we are convinced that it is not so. The "tidy mind" is not given to everyone, nor is the "critical spirit." Yet both are invaluable qualities in the medical practitioner. We are convinced that, if superintendents in hospitals in India would but pay a little more attention to this matter, the quality of medical journalism in this country would become enormously improved. The "medical history sheet" of the British and Indian armies may not be ideal, but every military medical officer knows how useful it is; in it one can gain at a glance the previous medical history of the patient, what he has suffered from previously, and the lines of treatment adopted. The Great War forced upon the medical authorities at the War Office the necessity for reform in this matter, and, as everyone who served during the war knows, there was enormous improvement in case records year by year. In the civilian hospitals in India, however, the need for reform is urgent.

One of the most recent activities of the Rockefeller Foundation has been the commencement of the publication by its Division of Medical Education of descriptions of clinics, laboratories, and methods of teaching in different medical institutions in the world in order that the information so collected may be brought to the attention of those most interested in convenient form. The programme outlined may at first sight seem to be a modest one; if one reflects upon it, however, it is seen to be one which may immensely improve methods of teaching, hospital construction, and hospital organisation.

The fourth series of these publications deals especially with the methods of recording case histories, laboratory and allied findings, filing, and following up of patients adopted at the well-known Presbyterian Hospital in New York.* "Modern methods of hospital care and of student instruction demand complete, compact, readily available, and easily utilizable records of dispensary and hospital care, including each stay, if

* *Methods and Problems of Medical Education*. Published by the Division of Medical Education, The Rockefeller Foundation, 61, Broadway, New York. Fourth Series. The Record Room, Unit History System, and Follow-up System of the Presbyterian Hospital, New York.

more than one, in the hospital; and, in addition such notes as are pertinent to a follow-up system or social service survey. Moreover, the constantly increasing number of laboratory, instrumental, or special methods of examination must be included.... Finally, the assembling of the constituent parts of the record and its storage must be arranged in such a way that the notes on a single patient may be readily and quickly procured as occasion for their use arises," write the authors.

After a study of the methods adopted in several admirable systems, the authors decided that the one in use at the Presbyterian Hospital, New York, was the best. In this booklet it is fully described, with a reproduction in facsimile of one entire original case record as a guide.

We do not say that this particular method is the best for adoption to Indian conditions. But we do claim that there is room in India for improvement. We may have progressed since the days when the patient's case history was recorded on a sun-dried "bath-brick in Babylon," but that ancient record had at least the value of permanency. We are convinced that the problem is one which requires urgent consideration by administrative as also by executive medical officers in India; that a study of it would lead to enormous improvements; that it would raise the all-too-low present standard of medical journalism in India; in a word, that consideration of it is urgently required. It is often stated that it is impossible to follow-up an Indian patient. It is true that it is often very difficult; but the experience of the Pasteur institutes in India over nearly quarter of a century, and of Dr. Napier at the Calcutta School of Tropical Medicine in his kala-azar clinic proves that it is not impossible; one can get quite 70 per cent. of replies.

But a close study of the standard forms to be adopted so as to minimise labour and yet ensure permanency of record is required. And in this admirable booklet the medical administrator will find many most helpful suggestions.

SPECIAL ARTICLE.

THE ARTIFICIAL PNEUMOTHORAX TREATMENT OF PULMONARY TUBERCULOSIS.

By Y. G. SHRIKHANDE, M.B., B.S., B.Sc.,

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TUBERCULOSIS of the lungs is a far more serious condition than tuberculosis of most other organs. Take for instance the hip-joint

or the knee where the diseased part can be put entirely at rest by splints, etc. Not so with the lungs, direct treatment of which has always been a difficult task. The introduction of artificial pneumothorax and other thoracoplastic operations therefore has made a great advance in the treatment of pulmonary tuberculosis—an advance that needs a brief description at this time when the seriousness of this scourge of mankind has come to be realised in India. It is disappointing to note, however, that its importance is being underrated by a certain section of the medical profession who probably do so not from any personal experience of it, but rather from a lack of knowledge of its technique and mode of action. It appears that with them the treatment of phthisis begins and ends with fresh air and good food. They forget that fresh air alone cannot be regarded as a sovereign remedy, for if it alone were a "cure" for consumption, one might well ask what need there was for Koch's tuberculin or Moellgaard's sanocrysin? The fact of the matter is that our knowledge of tuberculosis is still in the making. Fresh air and good food alone cannot and should not be regarded as the be-all and end-all of treatment. No single remedy is enough; different methods are required for different cases, and in the same patient a combination of remedies is often found useful. With regard to artificial pneumothorax, one may quote, however, the opinion of Sir James Kingston Fowler who says that "artificial pneumothorax is the only advance in the treatment of pulmonary tuberculosis since the introduction of sanatorium treatment as carried out at Nondrach."

Indeed, no brighter ray of hope has been offered to the consumptive than the treatment by artificial pneumothorax.

Recommended on theoretical grounds about a century ago, it was not till recently that any serious attempts at treatment were made with it, and to-day it occupies the position of supreme importance in the treatment of pulmonary tuberculosis which is undoubtedly its due. For, though its trial was first urged in 1821 by James Carson of Liverpool, it was only about the year 1890 that experiments in artificial pneumothorax were commenced seriously by Fortellini of Italy and Murphy of America. They attracted the attention of Brauer of Germany, who changed the technique of introductory insufflation from that of puncture to open incision down to the parietal pleura and its perforation by a blunt cannula. Although his method of operation has since been practically abandoned, the safety achieved by the addition of the water manometer to the armamentarium stands to his and Saugman's credit.

Pneumothorax treatment has since found its way in all the civilized countries. There

is scarcely any other field of modern therapy in which so much work has been done. And with regard to no method of treatment perhaps does less difference of opinion exist as to its utility, technique and application. The greatest thing to its credit is that it is especially applicable to the treatment of advanced cases. It is to the "lost" case of phthisis that pneumothorax treatment offers a chance of life.

The aim of pneumothorax treatment is to bring about "compression, immobilisation, and disexpansion" of the affected lung by introducing gas into the pleural cavity. It is difficult to say in the present state of our knowledge whether the good results are due to the virtual "amputation" of the diseased organ, or to the "splinting" of it.

Artificial pneumothorax is the ideal way of inducing collapse of the lung. Its advantages over other methods of collapse therapy are that:—

(1) The introduction of collapse, if rightly done, is practically without any operative danger.

(2) It preserves a physiological harmony between the two sides of the chest.

(3) The collapse is established gradually, giving time for the patient's system to adapt itself to the new physiological conditions.

(4) The contour of the chest and the symmetry of the body are preserved.

(5) The dosage can be regulated according to the requirements of the lungs, and at any moment the collapse can be reduced by removal of gas.

(6) When thought fit, re-expansion of the lung can be allowed, so as to permit it to regain its lost function.

Mode of Action:—What is the *modus operandi* of pneumothorax treatment? From the clinician's point of view it acts in two ways, namely, locally and generally.

(a) *Local Action:*—The affected lung is squeezed up into a firm mass of functionless tissue in which the tubes and cavities are flattened out and fibrous tissue grows. The tuberculous process is in abeyance and no fresh tubercles grow. Caseous areas are rendered drier, and cavity walls unite. Stasis of lymph is brought about, and absorption of toxins is reduced to a minimum.

(b) *General Action:*—Immobilisation causes a decrease in the production and circulation of toxins, with the consequence that the resisting power of the whole system is increased. The removal of toxæmia is evidenced by the disappearance of fever, and by diminution of cough and sputum and marked improvement in the patient's general condition.

Indications and Contra-indications. The success of pneumothorax treatment depends on the suitable selection of cases. Indicated for progressing, marked, and even advanced disease, it is nevertheless only applicable to a selected

proportion of such material. It is to be hoped that with experience the benefits of this treatment will be extended to a much larger proportion of patients than is the case at present. To achieve success the operation must be performed at the suitable moment, and no case should be allowed to drift into the stage of contra-indication.

Complete collapse of the lung constitutes a very definite interference with natural conditions. It throws the patient on his last line of defence, for the success of treatment depends upon the other lung remaining free from gross disease. A very careful selection of cases is therefore necessary. Failure in this respect will tend to discredit and minimise the value of this most effective form of treatment. We should therefore have a clear idea of the indications and contra-indications, and the following considerations should be taken into account:—

(1) What is the prognosis in individual cases with conservative treatment? If this is not satisfactory, then only should the advisability of treatment by artificial pneumothorax be considered.

(2) If pneumothorax is considered necessary ascertain

(a) whether the character or extent of the tuberculous affection is such that pneumothorax is likely to be successful.

(b) whether there are any contra-indications present in or outside the lungs.

From the anatomical point of view there should be no difficulty in normal individuals in establishing a collapse by artificial pneumothorax. Introduction of a small amount of gas into the pleural cavity would be enough to neutralise the negative pressure and produce a thorough collapse of the lung. Somewhat different are the conditions when the lung is changed by a disease which diminishes the elasticity and causes rigidity of the lung tissue. Another and often more troublesome complication is the thickening and adhesion of the pleural surfaces caused by the disease. These complications interfere in the most detrimental way with the treatment, making the technique much more complicated and even unsatisfactory in the most experienced hands.

The ideal case for artificial pneumothorax is one in which the disease is active and confined to one lung only. But experience shows that no advanced case of phthisis is strictly unilateral. Thorough examination in practically all such cases will reveal abnormality in the sound lung. But experience also shows that in cases with a limited active affection of the better lung, collapse therapy often turns out successfully. It often causes improvement (in the better lung) during the course of treatment owing to the exclusion of more toxic foci from the other (worse) lung. Commencing slight affection of the better lung therefore should not necessarily be regarded as a contra-indication. It may even

be said that commencing affection in the better lung may suggest the earliest possible establishment of pneumothorax. In such cases, however, the better lung must be examined carefully and frequently and if the disease still shows signs of spreading, the pneumothorax must not be induced. In cases where both lungs appear to be equally involved, the possibility of "partial" pneumothorax of both lungs simultaneously may be considered. When the affection is more advanced and is evidently spreading in the opposite lung, pneumothorax is absolutely contra-indicated.

Collapse of the lung is indicated in cases where hæmoptysis is so profuse and continuous that the patient's life is threatened. It is also indicated in cases where hæmoptysis is periodic and prevents the patient, otherwise fit, from resuming the normal conditions of life.

When spontaneous pneumothorax has occurred in a more or less one-sided case and no infected material has escaped into the pleural cavity, the collapse should be maintained by artificial pneumothorax. This removes the danger of re-opening the tear in the lung as it re-expands and the consequent danger of acute infection of the pleural cavity.

The presence of pleurisy on the affected side often indicates induction of pneumothorax; this prevents the formation of adhesions.

Laryngeal and abdominal tuberculosis are not necessarily contra-indications, as was formerly considered. It is obvious that the exclusion of such a large organ, as a lung, which when seriously diseased produces a large amount of toxic material, may be of assistance in the fight against other tubercular foci elsewhere in the body.

Complications in the lungs other than tubercular may be considered as contra-indications, e.g., advanced emphysema, asthma, etc. Organic diseases of the heart and kidneys are contra-indications since pneumothorax puts an extra strain on them. The presence of diabetes and venereal disease may temporarily or permanently mean a contra-indication.

Technique:—Air, oxygen, or nitrogen is introduced into the pleural cavity under slight pressure. The most complicated instruments have been suggested for the purpose, but a simple armamentarium is quite enough and is to be preferred to a complicated one. The principal parts of the apparatus consist of two big bottles (a "gas" reservoir and a "water-pressure" reservoir) and a manometer on which the pressure in the pleural cavity can be read. A water manometer with rather a narrow lumen is that most commonly used. By means of a T-tube the manometer is connected with the gas reservoir and with the needle and so with the pleural cavity. The gas reservoir is connected with the water

reservoir from which the water can be led by syphon action into the gas reservoir so as to drive the gas through the needle into the pleural cavity. The connections are made by rubber tubing.

For the initial operation Clive Riviere's trocar cannula should be used (injury to the lung will thereby be avoided), and for the refills Saugman's or Kjer-Petersen's needle is quite suitable; the latter possesses a side opening. It goes without saying that absolute asepsis must be observed in the technique. The needle should be perfectly dry and clean and the apparatus in good working order.

Site for Puncture:—The most suitable site for initial puncture is the fifth or sixth intercostal space in the anterior axillary line. When this site is for any reason not available, the second or third intercostal space in or outside the mammary line may be chosen. On the left side a good distance from the heart dullness must be observed. It is well to remember that the point farthest from the older foci of disease and where signs of disease are absent or less marked is the most suitable spot for puncture; it is here that free pleura is likely to be found. The presence of pleural friction is also evidence of the absence of adhesions. The neighbourhood of cavities, particularly superficial cavities, is quite unsuitable for puncture; as also caseous areas and areas of consolidation.

Two very important risks to be avoided during the operation are pleural shock and gas embolism. The former is obviated by giving a hypodermic injection of $\frac{1}{4}$ grain of morphia half an hour before the operation and by anæsthetising the whole track of the needle and also the parietal pleura by novocaine. Gas embolism can to a great extent be prevented by not allowing the gas to escape from the needle until the manometric reading shows that the needle is in the pleural cavity, and then by allowing the gas to enter the pleural cavity at a slightly negative pressure at the commencement. When a negative pressure of more than 5 cm. is observed, it can be safely considered to indicate a free pleural cavity.

At the introductory puncture it is advisable not to introduce more than 300 c.c. of gas. While removing the needle from the chest it is well to lift up a large fold of the chest wall with it and after its withdrawal, to manipulate and rub it, so as to obliterate the needle track as far as possible. This reduces the possibility of surgical emphysema.

Refills:—The successful induction of artificial pneumothorax needs a continued series of "refills." The operation for these differs a little from the original one. No morphia is necessary now, but novocaine should be used every time, since the risk of pleural shock cannot be entirely put aside. The spot for

introducing the gas should be as near the original one as possible; later on, if more convenient, it can be made at some other part of the chest.

The absorptive power of the pleura is at first more active. The thin endothelium of the fresh pleura allows quicker absorption than later, when the continued treatment has brought about a reactive change of structure. To begin with, therefore, refills have to be given more frequently. The first refill is given the day after the first injection. An extra day or two is then added to each succeeding interval until collapse is as complete as can be obtained.

In cases where the lung collapses readily, it is wise to keep below atmospheric pressure till about the third refill, after which the pressure can be gradually raised till collapse is complete, which is obtained by the fifth or sixth refill.

The optimum degree of collapse (the optimum pressure is the "lowest" pressure which will suffice to maintain the lung fully collapsed) for each individual has to be settled empirically. The intervals between the refills are so planned as to provide the best degree of collapse, and the quantity of gas to be given is settled by individual peculiarities determined by the signs, symptoms and x-ray findings of the patient.

In cases with practically no adhesions the optimum pressure to maintain a thorough collapse is ordinarily seen to be about zero. In smaller localised adhesions it may be necessary to raise it to 1, 2 or 3 positive pressures. In cases of more extensive adhesions it may have to be raised to very high positive pressures.

Duration of Treatment:—It is often a difficult matter to decide how long the collapse should be maintained. The tendency is and should be to keep it going as long as possible. Some cases remain completely collapsed for many years, but in others re-expansion takes place in spite of the refills with increased positive pressures. Such cases are those with persistent pleural adhesions which in time contract, pulling the lung out and obliterating the pneumothorax cavity.

This natural expansion of the lung and obliteration of the pneumothorax cavity is usually associated with good results, and therefore is a condition that should be welcomed as a solution to a difficult problem, provided that it does not occur too early in treatment. The needs of individual cases have however to be considered. It is wiser to continue the refills as long as the patient is willing. But if for any reason it is desirable to discontinue, at least two, but preferably three years should be given as the time necessary.

Discontinuance should be done gradually. Smaller refills should be given until finally the lung is allowed to re-expand. Frequent examin-

ations should be made so that if any signs of active disease are still found, the pneumothorax can again be established and the formation of synechia avoided.

Accidents and Complications:—The treatment is not without its accidents and complications. The chief accidents are pleural shock, gas embolism, surgical emphysema, and perforation of the lung. To a great extent they can be avoided by observing the proper technique and precautions.

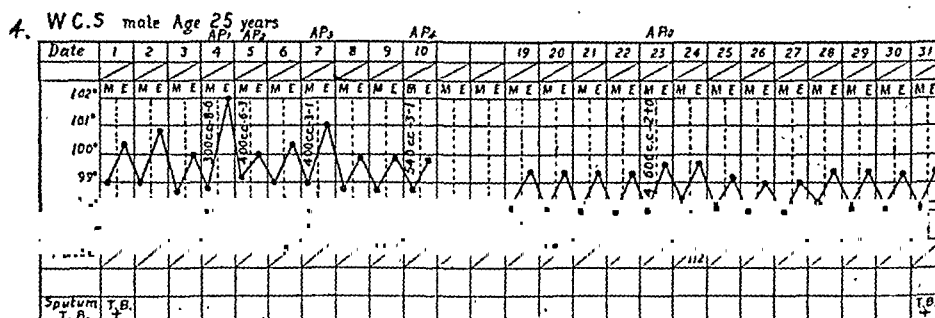
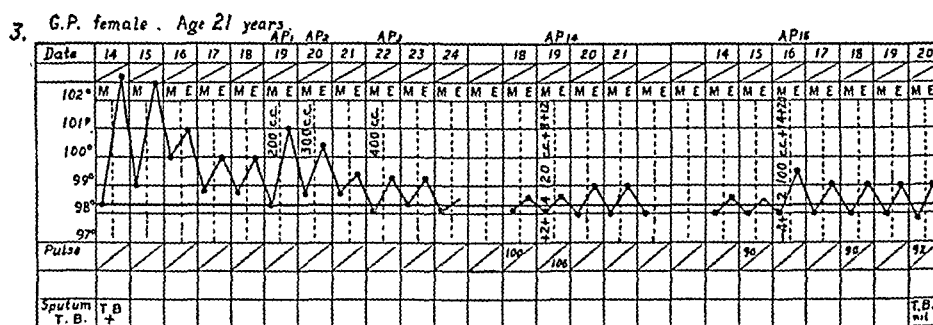
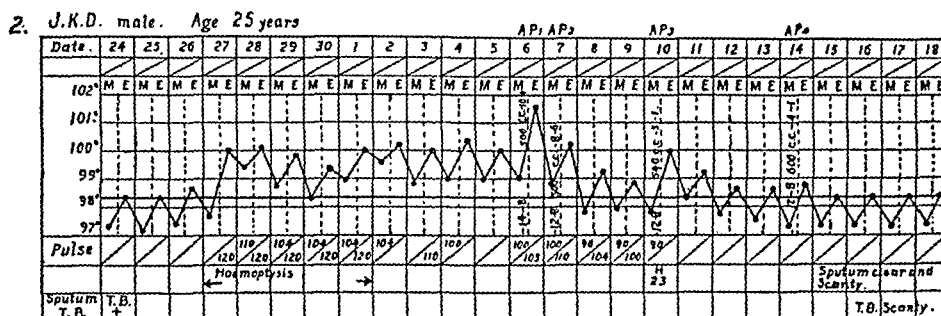
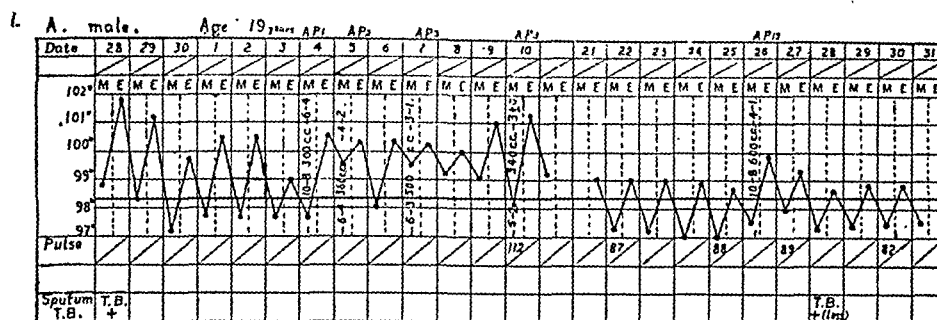
More important complications are extension of the disease in the other lung and pleurisy. The former may necessitate the discontinuance of the treatment. Milder forms of the latter do not require any additional treatment. If the effusion is large enough to cause discomfort to the patient it may have to be tapped and replaced by gas. In replacing the fluid the quantity of gas given must be much smaller than that of the fluid removed. If the fluid is left it will usually cause obliteration of the pneumothorax cavity by pleural adhesions and fibrosis. If this result is desired—for many cases of this type have been found to do well—the fluid should be left, unless of course it causes displacement of the mediastinum and consequent discomfort to the patient, in which case a sufficient quantity of the fluid should be aspirated.

Conclusion:—Judging from the results available from various sources, it would appear that, even if the results are not permanent, the prolongation of life, increased comfort and well-being, and return of power to work entitle this mode of treatment to a high place in the treatment of consumption. Indeed, if nothing else, pneumothorax treatment can bring back those who were otherwise labelled as "hopeless" to a life of comfortable existence. This striking success of the treatment impresses itself on those who practise it.

I desire to draw the attention of the medical profession in India to this promising method of treatment which has so far been neglected in our country. "Now that artificial pneumothorax treatment is more common, a patient can usually arrange for his refills wherever he wishes to live and is not tied as he used to be " This has been said of Great Britain. Can the same thing be said of India where it is not being practised even in all the sanatoria, let alone big towns? So far as I know Bhowali and Madanapalle are the only two sanatoria in India that are practising it. Such being the situation, I ask, what are the patients who receive artificial pneumothorax in these two sanatoria to do when they leave the sanatoria? Where are they to receive the refills? The treatment is a long one and refills are needed very frequently. It is not within the means of an average patient to stay in the sanatorium for the whole period; nor is it possible for him to go

to a distant place (where the treatment is carried out) for it. I therefore appeal to the profession to consider this point seriously, and to take up this so far neglected yet very promising form of treatment in earnest and solve the difficulty of such patients. I also

Bhowali. With the kind permission of the Superintendent, Captain R. K. Kacker, I.M.S., T.D.D. (Wales), I give below a few cases to illustrate my article. We are handicapped at present for want of an x-ray installation which we expect to have some time next



appeal to the heads of the medical departments of various provinces to provide all the hospitals of big towns with the apparatus to enable them to carry out the treatment.

As I have stated above, we are carrying out the artificial pneumothorax treatment at

year. In the absence of x-ray findings the progress of the cases has been judged by symptoms and signs.

(1) A., male, aged 19 years:—

Ten months' history of cough with expectoration, fever, and weakness. Ill-nourished, emaciated and

anæmic. Temperature 98.2°F. to 100.2°F. Disease apparent in the left upper lobe; right apex suspicious. Artificial pneumothorax attempted on the 4th May 1926, and free space was found at second puncture in the axillary region. After the third refill the mediastinum was found to be displaced a little, causing discomfort. Gas was therefore given in a smaller quantity. Up to date twelve refills have been given. The lung seems to be fairly well collapsed. No crepitations are audible and breath sounds are almost inaudible. No increase in signs at the right apex. Temperature 97.4 to 99.0. Tubercle bacilli still present in sputum but scanty. (See temperature chart.) Has slightly enlarged glands in the abdomen; bowels are irregular. Hence not an ideal case. The slight temperature is probably due to the abdominal complication.

(2) J. K. D., male, aged 24 years:—

Slight cough and expectoration of long duration. Was in the sanatorium last year and again came up this year at the beginning of the session. Kept fairly well till the 25th April 1926 when he got hæmoptysis which persisted in spite of medicinal treatment. Artificial pneumothorax was therefore attempted on the 6th May 1926, and free space was found at the first puncture without any difficulty. The hæmoptysis stopped soon after, and the temperature showed signs of settling down after two refills. The lung is thoroughly collapsed. Temperature 97.4 to 98.4. Steadily gaining weight; walking about 2 miles a day. Tubercle bacilli have become very scanty.

(3) G. P., female, aged 21 years:—

History of cough with expectoration, fever, and weakness. Tubercle bacilli present in sputum. Signs of cavitation in the left upper lobe. Right lung clear. Temperature before artificial pneumothorax as shown in the attached chart. After three refills the temperature showed signs of settling down. This patient later on developed pleurisy with effusion. Suspicion arose from manometric readings as the pressure used to rise high after injecting small quantities of gas. Diagnostic puncture was therefore made and fluid was found. Artificial pneumothorax has therefore been suspended. General condition still good. Temperature 98.0 to 99.0. Steadily gaining weight. Tubercle bacilli disappeared from sputum.

(4) W. C. S., male, aged 25 years:—

Five months' history of cough, expectoration, fever, poor appetite, etc. Ill-nourished, emaciated, anæmic. Temperature 99.0 to 101.0. Tubercle bacilli in the sputum. Signs of excavation in the right lung. Suspicious signs in the left lung. Artificial pneumothorax induced on the 4th June 1926 and is still being carried on. The affected lung is fairly well collapsed. General condition is better now. Temperature 98.0 to 99.4. Tubercle bacilli still present. Gaining in weight. Has abdominal complications which probably account for the persistence of the fever.

Current Topics.

Experimental Work on Dengue.

SUFFERERS from dengue are apt to take themselves very seriously, though their medical attendants are not. Yet the economic importance of dengue in the tropics is very great; during an epidemic some 40 or 50 per cent. of the population of a city may be prostrated by the disease, and the loss in business resulting may run into lakhs or even crores of rupees. Further, the disease bears a curious resemblance to the milder forms of yellow fever, whilst its causative organism is unknown, and many problems in connection with its prevention and control call for investigation.

When the Medical Research Board was organised for the Philippines in 1922, the investigation of the ætiology of dengue was recognised as one of the most important

problems to be studied. Lieutenant-Colonel J. F. Siler, and Majors M. W. Hall and A. P. Hitchens were appointed to this investigation and commenced work in 1924. Reports on their work appeared in the *Philippine Journal of Science*, Vol. XXIX, Nos. 1 and 2, pp. 304; but the whole series of papers has now been incorporated as a complete memoir, together with all protocols of the experimental work, and was published in May 1926.* We cannot refrain from most warmly congratulating the authors on this publication. It is a monumental study of dengue from every aspect; whilst in addition to the account given of the large volume of experimental work carried out, its full historical and clinical account of dengue, and above all its exceedingly complete bibliography at the end will render the volume one of great interest to all medical men in the tropics who are confronted with epidemic dengue.

The volume is divided into several different sections, and as it is difficult to summarise we quote mainly from the authors' own summaries. In the first sixty pages a full account is given of the world history of dengue, a disease which has been known since 1779, if not earlier. Its great prevalence is shewn by the fact that no less than 49 more or less widespread epidemics are recorded from different parts of the world during the period 1899 to 1920 in the literature. In their summary of the historical aspects of dengue, the authors write as follows:—

"1. Yellow fever and dengue, in the mechanism of their transmission, are practically identical, and the transmitting agent for both is *Aedes ægypti*. These facts suggest that the history of dengue is likewise closely associated with the history of yellow fever. If this should be true, a study of the history of yellow fever might reveal evidence of the existence of dengue in earlier times in regions where yellow fever is known to have prevailed.

2. A search of the sources available has shown that yellow fever existed in tropical America prior to the first voyage of Columbus, and early reports of the epidemics that occurred in yellow fever areas indicate that dengue did exist at an early period, but was not always clearly differentiated from the more serious disease to which it is related.

3. As a result of our historical research we have formulated the hypothesis that dengue, as well as yellow fever, originated in tropical America.

4. The earliest epidemics of dengue of which we have accurate reports occurred in widely separated parts of the globe—Java, 1779; Cairo, Egypt, 1779; and Philadelphia, United States, 1780.

5. The account of Benjamin Rush, describing the 1780 epidemic in Philadelphia, is so clear that there can be no doubt as to the identity of the disease. His description is lucid and corresponds closely with the symptoms of dengue as we have seen them in Manila. There is a possibility that the epidemics in Java and in Egypt were not dengue.

6. Following these reports, epidemics of dengue were studied in all parts of the tropical world, and also in cooler climates to which the disease and the mosquitoes had been transported.

7. Studies of epidemics established the symptomatology and revealed the fact that relapses in dengue are not uncommon; recurrences are comparatively frequent, and a certain number of persons suffer several attacks. In addition, from evidence accumulated, the rapidity of the spread of dengue is possibly second only to that of influenza.

8. Although mosquitoes had been suspected as the transmitting agents of dengue, it remained for Graham to demonstrate that these insects actually do transmit the infection.

* *Dengue: Its history, epidemiology, mechanism of transmission, ætiology, clinical manifestations, immunity and prevention.* By J. F. Siler, Milton W. Hall, and A. Parker Hitchens, pp. 476 plus 8 plates. Manila, 1926, Bureau of Science, Monograph No. 20. (Price not stated.)

9. The work of Ashburn and Craig, of Cleland, Bradley, and McDonald, and of Chandler and Rice added to our information concerning mosquito transmission. The last two groups of authors suggested that the evidence indicated that *Aedes aegypti* is the transmitting agent.

10. The work of this board has shown conclusively that *Aedes aegypti* is the transmitter of dengue, and the *Culex quinquefasciatus* is not.

11. Ashburn and Craig were the first to show that the dengue virus is contained in the circulating blood, and they were the first investigators to demonstrate that the cause of dengue is a filtrable virus.

12. Cleland, Bradley, and McDonald made important studies upon the distribution of the virus in the blood showing that it is present in all elements of the blood, although they suspect that it is attached merely to the erythrocytes; they found that the virus was present in the blood up to ninety-nine hours after onset, and that the drawn blood retained its infectivity for seven days if kept in the ice chest.

13. Carpenter and Sutton first called attention to the leucopenia, which is a fairly constant symptom of dengue.

14. All attempts to transmit dengue to the lower animals have resulted in failure to obtain clear-cut indications of infection.

15. The work of this board has shown that the *Aedes* mosquitoes transmit dengue; that they become infective by biting a patient during a period beginning a few hours before the first symptoms and up to the end of the second day. Infection of the mosquitoes is more or less uncertain after that time. Having taken the blood of the patient, the mosquito becomes infective only after the tenth day and retains its infectivity probably throughout the rest of its life.

16. Clinical observation with regard to the uncertainty of immunity to dengue has been experimentally confirmed. Natives of areas in which dengue is endemic are immune, but their immunity is believed to be acquired and not natural.

17. Carefully controlled studies to identify and attempts to isolate the causative micro-organism of dengue have so far not been successful."

Turning next to the transmission of dengue, two chief lines of experiment suggested themselves; to confirm the findings of other workers that *Aedes aegypti* (formerly known as *Stegomyia fasciata*) is the true vector of the disease, and to either prove or disprove the often repeated suggestion that *Culex quinquefasciatus* is a vector. The most rigorous precautions were taken to exclude infection by natural channels, the 64 volunteers used being kept in carefully screened wards, and the mosquitoes used were bred out from the egg. In 111 biting experiments made with females of *Aedes aegypti*, dengue was transmitted 47 times; all experiments with *C. quinquefasciatus* had entirely negative results. The authors' summary of this section of their work is as follows:—

"This report presents in detail a somewhat extensive series of experiments relating to the transmission of dengue by mosquitoes. These investigations have been pursued by the United States Army Medical Department Research Board at the Bureau of Science and at the Sternberg General Hospital in Manila.

Part I considers the plans and arrangements made and the preliminary work done in preparation for the actual experimental work. Part II concerns itself with the various sets of experiments made, the results obtained, and the conclusions drawn therefrom.

Part I.—The preliminary arrangements had for their basis the scope of the work contemplated, which covered the following points:—Confirmation of the reported transmission of dengue by the mosquito *Aedes* (*Stegomyia*) *aegypti*; incrimination or elimination of *Culex quinquefasciatus* as a transmitter; and investigation of the exact mechanism of transmission by mosquitoes.

Only two species of mosquitoes were used in the transmission experiments, *A. aegypti* and *C. quinquefasciatus*, and the reasons for so doing are explained. The

arguments presented indicate that no species other than these two are concerned in the transmission of dengue in Manila.

All the mosquitoes used in the experiments were bred from the egg. A period of approximately four months was spent in testing various food substances that might be suitable for the propagation of larvæ and in developing and perfecting a routine breeding technic. Normal horse serum was finally selected for this purpose, and formalin (1:2,500 to 1:5,000) was added to inhibit bacterial growth. In the later stages of the experimental work many experiments were made in breeding larvæ in solutions of tap water to which slices of ripe banana had been added, and this type of food was found to be superior to blood serum. In work of a similar nature the use of banana as food for larvæ is recommended for both *A. aegypti* and *C. quinquefasciatus*.

All reserve stocks of adult mosquitoes were fed on aqueous solutions of sugar, and this type of food proved to be satisfactory in all respects.

As a rule *A. aegypti* mosquitoes were used experimentally for initial biting from two to seven days after emergence, and *C. quinquefasciatus* mosquitoes were not more than five days old when first fed on blood.

The exact number of mosquitoes, as well as the species used in each experiment, was always known, and the biting of human beings was always under control and exclusively at the will of the board.

After the infecting exposure to dengue patients of freshly bred mosquitoes, all not showing complete distention with blood were removed and killed. It was known, therefore, that all mosquitoes used subsequently to determine their infectivity for volunteers had been potentially infected.

Freshly bred *Aedes aegypti* would not bite freely on the day of their emergence, but after they had taken food (solution of sugar) and had been fertilized, they took blood freely—usually 100 per cent. of them.

Aedes aegypti in the Philippine Islands bite freely at any time during the day, and night biting, though unusual, also is observed. The biting habits of *C. quinquefasciatus* were found to be erratic; they would take blood only at night and, even under the most favourable conditions, but a relatively small proportion would do so.

The experimental subjects consisted of military personnel that proffered their services voluntarily. Sixty-four men were used. The volunteers were specially selected and in general met certain basic requirements—freedom from disease, including syphilis; short service in the Philippines; and non-immunity to dengue.

The experiments were made in a specially prepared ward in a large military hospital in Manila, and extraordinary precautions were taken to exclude mosquitoes. The ward was administered by specially selected personnel, one of the most important functions of whom was the detection and destruction of mosquitoes that might possibly gain entrance to the ward or its vestibules.

Part II.—The transmission experiments presented in this report include a total of fourteen injections of virus blood, of which five were positive; one hundred and eleven biting experiments with *Aedes aegypti*, of which forty-seven were positive; and seven biting experiments with *Culex quinquefasciatus*, all of which gave negative results. Among the sixty-four volunteers used, dengue was produced experimentally in fifty-two instances (81 per cent.).

In the conduct of the experiments, the general policy was adopted, in each series, of using successively all available methods for producing the disease—biting, followed in many instances by repetition, and this followed in turn by injections of virus blood. All negative results were adequately controlled—biting by mosquitoes known to be infective or by injections of virus blood.

Previous reports of the transmission of dengue by *Aedes aegypti* were confirmed—forty-seven positive results.

Experiments were made with eight volunteers to fix the incubation period of the virus in the mosquito, and it was found that the mosquito did not become infective

until the eleventh day after its infection. The evidence obtained indicates that even on the eleventh day after their infection *Aedes aegypti* may be incapable of transmitting the virus. The limits of incubation of the virus in the mosquito apparently are from the eleventh to the fourteenth day.

Experiments were made with twenty-one volunteers to determine the stages during which dengue patients are infective to *Aedes aegypti*. The results obtained indicate that the patient is infective to mosquitoes during the first three days of the disease, but that on the third day of an attack the mosquito will frequently fail to pick up the virus. It is demonstrated, furthermore, that individuals in the late prodromal stages of dengue—six to eighteen hours prior to onset—are infective to *Aedes*.

The experimental evidence obtained warrants the statement that once *Aedes aegypti* becomes capable of transmitting the virus to human beings this characteristic is retained throughout the remainder of the mosquito's life. Experimental dengue was produced in three volunteers with mosquitoes that had been infected, respectively, sixty-two, sixty-six, and seventy-five days previously.

Endeavours were made to infect seven volunteers with potentially infected *Culex quinquefasciatus* (*C. fatigans*), and all such experiments were entirely negative. The volunteers were then bitten by *Aedes aegypti*, infected from the same sources and on the same day as the *C. quinquefasciatus* used in the previous experiments, and all came down with dengue. The conclusion is drawn that *Culex quinquefasciatus* does not transmit dengue.

Three volunteers were used to ascertain the possibility of the heredity transmission of the virus in the mosquito. The results obtained were entirely negative. When the experimental subjects were subjected to control experiments all three developed dengue. The evidence suggests very definitely that the virus of dengue fever is not carried from infected *Aedes aegypti* through its eggs to the next succeeding generation.

The incubation period of the disease in the forty-seven experimental cases varied from four to ten days, inclusive. For all practical purposes the incubation period may be considered as being from four to six days, inclusive, as it fell within that period in 89 per cent. of the experimental cases reported.

In forty-one of the forty-seven cases of dengue experimentally produced the virus was derived from the same strain, and this strain was passed from man to mosquito and back to man through six generations. There was no evidence that the virus suffered attenuation or that its virulence was increased as a result of continuous alternate passage through man and mosquito.

The numbers of potentially infected *Aedes* that took blood for infecting purposes in the forty-seven positive cases varied from two to thirty-six, and 50 per cent. of the positive cases were bitten by from two to ten potentially infected mosquitoes.

The preliminary periods of isolation and the time interval between biting experiments, with one exception, were not less than eight days and did not exceed eighteen days."

In the third section of their work, the authors give a very complete account of the epidemiology of dengue in the Philippines. The similarity in epidemiology of dengue with that of yellow fever is very striking. From a practical point of view the measures which, in the hands of the Americans, have proved so very successful in stamping out yellow fever in South and Central America are the ones to adopt against dengue. The authors summarise this section of their work as follows:—

"Dengue has no mortality and is not a reportable disease in the Philippine Islands. It but infrequently attacks the native population in recognizable form, and it is assumed that this is due to an acquired immunity. A study of its epidemiology in the Philippines, therefore, is limited to a consideration of its occurrence in the Caucasian residents, particularly those recently

arrived. As morbidity statistics relating to its occurrence are obtainable only from army sources, this discussion is based on its occurrence among army personnel.

Analysis of the morbidity and mortality statistics for all diseases in troops during the past twenty-one years indicates that great progress has been made in the control of transmissible diseases. The decline has been of such magnitude that the sickness and death rates for the latter half of the period approximate only half of those recorded for the first half. No such progress in prevention can be reported for dengue, and three of the worst epidemics ever experienced by American troops serving here were those that occurred in 1920, 1923 and 1924. During the twenty-one years, the average number of days lost from duty by military personnel because of dengue approximated seven thousand days a year.

It was found that venereal diseases, malaria, and dengue were the principal causes of sickness. Material progress has been made in the prevention of venereal diseases and malaria, but none can be reported for dengue.

A study was made of the occurrence of dengue during the past three years at six military stations, and it is shown that the disease attacks continuously and with greatest frequency troops stationed in Manila. It is further demonstrated that epidemics of dengue but infrequently occur at outlying military stations (Fort William McKinley, Camp Stotsenburg, and Fort Mills). The factors responsible for inequalities in its geographical distribution are discussed.

The dengue season in Manila extends from April to November, though there is considerable variation within these limits. In 1922 the season did not begin until June, whereas in 1923 and 1924 it began in April.

The most reasonable explanation of the delay in 1922 is that there must have been a marked reduction in the *Aedes aegypti* population during the early months of that year resulting from adverse environmental conditions. To test the validity of this assumption a study was made of the daily rainfall during the three years. It was found that less rain fell during the early months of 1922 than during the same months in 1923 and 1924, and that environmental conditions undoubtedly were less favourable for the breeding of *Aedes* in 1922 than was the case during the same season for the two succeeding years. As the two other factors necessary for the occurrence of dengue in epidemic proportions were present—cases of dengue and a large number of non-immunes—the conclusion is drawn that the factor responsible for the delay in the epidemic in 1922 was a reduction in the *Aedes aegypti* population."

The authors made repeated attempts to isolate the causative agent of dengue. Owing to the great similarity of dengue to mild yellow fever, it has long been suspected that the disease is due to a leptospira. Here all such attempts failed, but the necessity for obtaining the blood within the first 24 hours of onset of the disease is emphasised. The clinical course of dengue with its rash and joint pains is suggestive that the organism of dengue may be in the blood stream only during the first few hours of the disease, and may thereafter be filtered out of the blood stream into the connective tissues, or other sites. The authors emphasise that the blood in the very early phase of the disease is directly infective if injected into a healthy and susceptible person.

"With regard to the entirely negative character of the results of the work here reported" writes the authors, "it is felt that one factor may have invalidated it to the extent that no definite negative conclusions should be drawn at this time. It will be remembered that during the course of our transmission experiments all attempts to infect mosquitoes from cases of dengue that occurred naturally proved fruitless. These attempts were made with the very earliest cases on which it was possible to establish even a presumptive diagnosis of dengue and thus were made at a stage of the disease closely corresponding to that at which blood was taken for use in our attempts at cultivation. In the section

on the clinical characteristics of dengue it is shown that the average duration of fever in our experimental cases was three and nine-tenths days, while the average duration of fever after admission to the hospital in twenty-five consecutive cases of dengue admitted to the hospital during the same period was only one and nine-tenths days. This can mean only that, on the average, cases during that time were admitted to the hospital on the third day of the disease. Taking into consideration, then, the results obtained in infecting mosquitoes on the different days of the disease, and the results recorded here and elsewhere as to the infectivity of the blood on direct transfusion, it appears evident that no negative reports of any kind should be regarded as conclusive unless based on material obtained during the first twenty-four hours of the illness."

Turning to the clinical aspects of dengue, the authors had in all 48 volunteers who were successfully infected by mosquito transmission under hourly observation from a period prior to their being bitten up to the time that they recovered from the disease. Further, they were able to compare the symptomatology in these experimentally infected volunteers with that reported in connection with the general epidemic in the local population. Hence their clinical account of dengue is of special interest. They summarise the symptomatology of dengue as follows:—

"1. Individual cases of dengue vary greatly in severity of subjective symptoms, intensity and duration of fever, and almost all other clinical manifestations.

2. Certain cases in our series were so mild that, in the absence of confirmation of diagnosis by further transmission of the virus, their inclusion in the series might well appear questionable.

3. The curves showing the frequency of cases of varying duration and varying intensity of fever suggest that dengue cases may occur in which fever is absent. Three cases, classified as negative in our experimental series, but showing suspicious symptoms after inoculation, offer further suggestive evidence to the same effect. No such cases were confirmed by transmission experiments, but it is our belief that afebrile dengue may occur, even in totally unprotected individuals, and that it may be a considerable factor in the spread of the disease.

4. The onset of dengue appears to be less abrupt than is usually believed. Sixty-five per cent. of our cases showed prodromes lasting from six to forty-eight hours before the initial rise of temperature.

5. Adenopathy is shown to be present in the vast majority of cases at onset, and should prove a valuable differential point in diagnosis. Loss or perversion of the sense of taste is also a valuable early symptom.

6. The shortest period of incubation noted in our series was four and a quarter days, the longest ten. The average period of incubation was slightly over six days. Periods much longer than ten days are shown to be extremely improbable.

7. The average maximum temperature reached during the course of an attack was just less than 102°F. The average duration was three and three-tenths days. Forty per cent. of the cases had definite 'saddle-back,' or diphasic, fever curves; 29 per cent. had curves suggestive of the diphasic type; the remaining 31 per cent. had simple single-wave curves. The relative rarity of the diphasic curve in spontaneous cases is shown to be due to the fact that they come under observation too late for the early fever to be noted.

8. The leucocyte count is not a dependable early symptom, as counts taken within a few hours of onset show great variation and average about normal. With the progress of the disease the total leucocyte count is reduced, the mean for the first four days becoming progressively less. However, 25 per cent. of our cases failed to show a leucopenia at any time during the course of the disease.

9. The so-called 'reversal' in the differential count, the reduction of the percentage of polynuclear neutrophils and corresponding increase of lymphocytes, is shown to be a function of the total count, both in normal

and in dengue cases. Dengue ... normal total counts do not show the ... The differential count of the white ... be of little diagnostic value in comparison with the total count.

10. The degree of leucopenia appears to be independent of the temperature at the time the count was made, and also of the severity of the disease as judged by the highest temperature reached during the attack, or by the duration of fever.

11. In only two cases, or 4 per cent., was it impossible to demonstrate an eruption at some period of the disease. The initial rash failed of discovery in seven cases. In half the cases, both rashes were observed, separate and distinct. In nine, the early rash persisted throughout. The type of rash bore no relation to the character or duration of the temperature curve. The terminal rash appeared as a rule at the end of the febrile period, but this rule is subject to considerable variation.

12. Toxic involvement of the nervous system is a prominent feature of the symptomatology of dengue."

The question of immunity to dengue was studied in the military forces stationed in Manila and in the indigenous Filipino population. Generally speaking the imported American from the States was found to be very susceptible, whereas there was a considerable degree of immunity in the indigenous population, almost certainly arising from previous attacks of the disease. The degree of immunity after an attack of dengue, however, is a partial one only, and the patient may have recurrent attacks in successive epidemics until he is as it were "salted" and now quite immune. The authors write:—

"1. An attack of dengue is followed by a period of increased resistance to the infection, but the duration of the immunity is exceedingly variable. Certain individuals suffer relapses; others have greatly protracted periods of convalescence; others have multiple attacks, at intervals sometimes surprisingly short. In general, the statement seems justified that subsequent attacks are less severe than the previous ones. In other words, immunity to dengue is not permanent, but diminishes more or less rapidly to a degree which no longer effectively enables the individual to resist the infection.

2. In an area of endemicity, it is likely that native children suffer their first attack of dengue early in life, and that the degree of immunity exhibited later in life is the result of acquired immunity constantly reinforced by frequent bites of infective mosquitoes. In every epidemic season a certain number of native people have clinical dengue. These may be persons who develop immunity with difficulty or who return to the susceptible state rapidly, or who have been removed from infective mosquitoes for a considerable period.

3. In a region where dengue is not endemic, but which is visited periodically by epidemics, the percentage of the native population attacked will depend directly upon the period elapsing since previous epidemics.

4. Our second epidemiological study indicates that, under military conditions in Manila, persons coming from the United States are attacked during their first year to the extent of about 40 per cent. Of those who have had one attack, 30 per cent. may expect a second; of those who have had two attacks, a certain percentage may expect a third; a few will have four attacks, but our figures are not sufficiently large to make a percentage estimate more than suggestive.

5. Experimental inoculations into a group of men who had had dengue at definitely known dates, resulted in second attacks, after intervals of 53, 55, 86, 98, and 121 days. Persons similarly injected after 32, 40, 46, 48, 50, 53, 60, 67, 68, 69, 74, 90, and 94 days were found to be immune. This experimental work confirms the epidemiological study in showing the individuality of the refractory periods which follow dengue.

6. Injections of dengue virus into twenty-nine Filipino soldiers revealed the fact that they were all immune to such experimental infection.

7. A review of our knowledge of immunity to other diseases shows clearly that we cannot transfer any of that knowledge, by inference, to dengue; but it does suggest a few interesting lines of research."

How can dengue be prevented? Only by the most vigorous anti-mosquito measures. And as *Aedes aegypti* is above all a household mosquito, the most hearty co-operation of householders is needed, or else the most stringent legislation against permitting mosquito breeding in houses and compounds. As far as India is concerned we feel that if individual householders will only have the energy to make inspections of their entire premises twice a week and deal with all sites for *Aedes* breeding, they could to a large extent save themselves and their households from the disease. The following plan is suggested by the authors for the conditions present in Manila.

"1. Dengue and yellow fever are transmitted by the same species of mosquito (*Aedes aegypti*), and the mechanism of transmission for both diseases is strikingly similar. Epidemics of both dengue and yellow fever are therefore subject to the same control measures.

2. The control of epidemics of dengue usually is accomplished by a material reduction in the mosquito population of the community.

3. The mechanism of transmission briefly is as follows:—The dengue patient infects mosquitoes during the first three days of illness; the infected mosquito is able to transmit the virus eleven days after its infection; infected mosquitoes remain infective throughout life; hereditary transmission of the virus does not occur.

4. Epidemics of dengue can occur only when there are simultaneously present cases of dengue fever, large numbers of *Aedes aegypti*, and large numbers of non-immune individuals.

5. *Aedes aegypti* control campaigns must be based upon a consideration of its life habits; it is one of the most highly domesticated of mosquitoes; it apparently does not hibernate; it disappears when the atmospheric temperature falls appreciably below 59°F. (15°C.) and remains there for any great length of time; it prefers to take blood from man; it is essentially a day-biter, but may take blood at night; its average length of life, under natural conditions, is probably not more than six weeks; it breeds by preference inside human habitations and on the premises thereof; it practically always deposits its eggs in collections of clear water; its eggs, being very resistant to an unfavourable environment, retain their vitality after storage in a dry place for several months; the eggs hatch normally in three days and the adult (free-flying stage) emerges ordinarily from eight to fifteen days later.

6. Dengue-preventive measures are based on two lines of attack; namely, co-operative effort on the part of individuals, both sick and well, and organized mosquito-control campaigns on the part of the public-health authorities.

7. Co-operative effort on the part of individuals should include the following factors:—Patients should protect themselves from the bites of *Aedes aegypti* mosquitoes during the first three days of their illness; mosquito nets should be used at night and during afternoon siestas; non-immune persons should avoid homes in which secondary cases of dengue occur; householders should destroy adult mosquitoes observed within the house; water should not be permitted to stand in uncovered receptacles in the house or on the premises for a longer period than seven days.

8. Consideration should be given to a number of factors preparatory to the formulation of the plan of campaign. If dengue has been endemic for a long period, many of the natives will have acquired more or less immunity, and epidemics usually are confined to the newly arrived non-immune foreigner from areas where dengue is not endemic. If the rate of flow of the non-immune population is small, extensive outbreaks are not likely to occur, and *vice versa*. In areas of endemicity maps should be prepared showing the following data:—Residential sections of the major part of the foreign non-immune element of population; the parts of the city

in which a permanent type of construction for buildings predominates, as distinguished from construction of a temporary character. Charts showing daily rainfall, humidity, and temperature should be plotted. During certain seasons of the year the rainfall will be so low and may evaporate so rapidly that it would be impossible for the *Aedes aegypti* mosquitoes to breed out in casual rain-water containers. During such seasons and under such conditions, inspections for breeding places should be concentrated on the other natural breeding places of *A. aegypti*. Temperature conditions influence the seasonal distribution of dengue, and in localities in which the temperature falls below 50°F. (10°C.) and remains there for a considerable period of time, epidemics of dengue will necessarily end with the advent of cold weather.

9. In carrying out anti-mosquito campaigns the principal line of attack should be eradication of the breeding places (anti-larval measures), but this should be supplemented by co-operative efforts on the part of the individual. The active interest and support of a moderate proportion of the population can be secured if adequate publicity of an educational nature is carried out. The area to be covered should be divided into districts and adequate and competently trained personnel assigned to each district as inspectors. Inspections should be made at intervals of not more than seven days, and weekly reports relating to breeding places detected should be submitted and consolidated in order that the effectiveness of the work may be evaluated."

We have quoted at some length from this splendid memoir, because it presents a very complete account of our present knowledge of dengue. The volume ends with a complete bibliography of papers on dengue, and full protocols of the experiments carried out.

It is clear that until the cities and municipalities in India are prepared to combat the *Aedes* mosquito by the most vigorous measures, they will continue to be swept by epidemics of dengue, with consequent great financial losses. But a public health "conscience" that can tolerate the transmission of malaria by anophelids, is hardly likely to take the even more stringent measures needed against the insect vector of dengue.

The Medical Aspects of Tobacco.

(*Lancet*, May 22, 1926, p. 961.)

THERE are prohibitionists and prohibitionists; but to judge from his delightful lecture on "The Medical Aspects of Tobacco" in the *Lancet*, for May the 22nd, 1926, Sir Humphry Rolleston is not amongst them. The result of prohibition of alcoholic drinks in America has apparently been that the American gastric mucosa has become inured to the effects of wood alcohol—a drink which would kill the less sophisticated European. Possibly one day tobacco will also be prohibited in the "States," but never—we imagine—in the East, which has indulged in it since time almost immemorial. Somewhere—we imagine in Thackeray—one seems to recollect the picture of the "Anglo-Indian" colonel of the 'fifties, seated on the flat roof of his bungalow in the early morning hours, smoking a large Burma cheroot, his gouty foot swathed in bandages, a large "brandy-pail" by his side, a fan waving over him, drilling his battalion on the barrack square beneath him. The picture is probably entirely libellous; the "Anglo-Indian" colonel of those days was probably (almost) as conscientious and hard-working as the Indian Army colonel of to-day—but the Burma cheroot remains.

Whether it is harmful or not, is the question. The Great War is blamed for many things; for the fact that the children of the next generation have lost all reverence for and obedience to their parents; for the introduction of jazz music and of negroid steps in the dance halls of western civilisation; for the collapse of the mark, the rouble, and the franc; but it should undoubtedly be blamed for one fact which is more rarely mentioned, the almost universal extension of the smoking habit. Peasant women in the depths of the Irish country-side used to smoke pipes in the 'sixties' of the

last century; their American-Irish grand-daughters of to-day whiff cigarettes in the lounge of the Ritz.

Sir Humphry Rolleston is perhaps a little severe on the inveterate smoker, but we think that perhaps he rather ignores the associations of tobacco, good fellowship, conviviality, even—in solitude—the faculty of quiet mental reflection,—“my lady Nicotine,” as Sir James Barrie terms the goddess.

The lecture itself however is destined to become a classic, whether with smokers or non-smokers in the medical profession. We have not hesitated therefore to take liberal extracts from it.

“The medical aspects of tobacco interest us all in our capacity as medical advisers of others, and, in addition, probably a certain proportion from a personal point of view. As in the case of alcohol, our opinions are inevitably coloured by our own tastes, for the teachings of the laboratory cannot always be rigidly applied to human practice or correspond with the empirical lessons of a lifetime. Animal experiments cannot well take into account idiosyncrasies, and with regard to alcohol and tobacco personal peculiarities are so important that they must often over-rule any hard-and-fast laws.

History.

Tobacco-smoking is very ancient, and its history shrouded in the obscure clouds of its own smoke, for it has existed in South America (Orinoco) and the West Indies from very early times; and in China old undated monuments bear engravings of pipes. In North America there is a tradition that during a time of dire famine a heaven-sent maiden descended among the Hurons and wrought a miracle by causing Indian corn, potato, and tobacco to spring up. In 1492 Christopher Columbus not only discovered America but the island of Tobago and the chiefs of Cuba in the act of puffing rolls of tobacco leaves, a primitive form of cigar called “tobago.” The Spaniards learnt smoking in America about 1560, and it was first introduced into England by Sir John Hawkins in 1565 or by Sir Francis Drake and Sir Walter Raleigh in 1585. Jean Nicot (1530-1600), the French Ambassador to Sebastian, King of Portugal, sent some tobacco seeds, which he obtained from a Flemish merchant at Bordeaux, to Catherine de Medici in 1559, and thus led to its use in France and to the immortalising of his own name in those of the plant, *Nicotiana tabacum*, and of nicotine—one of the many instances of man getting more credit than is his due. About this date Cardinal de Sainte Croix, Papal Nuncio to Portugal, and Nicolo Tornaboni, Nuncio to France, first introduced tobacco into Italy as a cure for the morbus gallicus (syphilis) and called it the “herbe sainte.” The name tobacco has also been derived from the language of the island of St. Domingo. “Tobacconist” originally meant one who smokes and not the seller of the commodity. The word “cigar” probably comes from the Spanish “cigarar” (to roll), and the spelling “segarr” occurs in Twiss’s “Travels through Spain” (1733) and is not unfamiliar now.

The use of tobacco since its introduction from America by Sir Walter Raleigh in 1585 has, like other innovations, good or bad whichever it may seem to you, excited opposition as well as welcome. Henry Buttes, “Master of Artes and Fellowe of C.C.C. in C.,” in his “Dyets Dry Dinner Consisting of eight severall Courses” (1599), made tobacco the last course and said that “It cureth any grief, dolour, opilation (obstruction), impostume, or obstruction proceeding of cold or winde.” King James I., in his famous counterblast (1604), vigorously condemned it; Raphael Thorius, a Fellow of the Royal College of Physicians and a devotee of tobacco, wrote “Hymnus Tabaci sive de Pacto” (1627), and with Matthew Gwinne, also a Fellow of the College and a poet, had the hardihood to argue in favour of the weed in a medical disputation held at Oxford for the edification of James I in 1605. William Barclay, Master of Art and Doctor of Physicke, in “Nepenthes or the Vertues of Tobacco” (Edinburgh, 1614), recommended it for many diseases, dropsy, arthritis, gout, epilepsy, and as “an antidote of hypochondricall melan-

cholie.” He must have been rather an optimist, for he continues; “It prepareth the stomache for meat; it maketh a clear voice; it maketh a sweet breath,” and after further extolling its medicinal powers, “in few words it is the princesse of physical plants.” In 1615 the Vice-Chancellor of Cambridge found it necessary, as, indeed, he probably would even in these more enlightened days, to proclaim that “no graduate, scholler, or student may presume to take tobacco into St. Mary’s Church, upon payne of finally expelling the University,” and Charles II, forbid Cambridge men “to wear periwigs, smoke tobacco or read their sermons.” In “A brief and accurate Treatise concerning the taking of the Fume of Tobacco which very many in these dayes doe too too (sic) licenciously use” by Tobias Venner, Doctor of Physicke in Bathe (London, 1637), it is written “Indians call it *petum* which indeed is also the fittest name that both we and other nations may call it by, deriving it of peto, for it is farre fetcht and much desired. And thus much for the name.” He adds that “it is hot and drie in the third degree, and hath a deleteriale, or venemous qualitie as I suppose; for it being any way taken into the body, it tortureth and disturbeth the same with violent ejections both upwards and downwards, astonishes the spirits, stupifieth and benummeth the senses and all the members. To conclude, therefore, I wish them that desire to have *mentem sanam in corpore sano*, altogether to abandon *infantum preposierumque tabacci usum*.” In 1624 Pope Urban VIII published a decree of excommunication against snuff-takers and Innocent XII extended this to smokers in 1690. In the interval (1634), smoking had been prohibited in Russia on pain of having the nose cut off. Strange as it may appear, Oliver Cromwell and the Puritans smoked tobacco, though the Society of Friends and the Salvation Army banned this form of indulgence. As recently as the early ‘fifties’ in the last century tobacco was at a very low ebb in England; snuff was going out of fashion, and the increasing practice of smoking was regarded by society as a low, vulgar habit suitable, indeed, for labourers, Bohemians, and the scum of society, thus re-echoing King James’ “surely smoke becomes a kitchen far better than a dining chamber.” A more modern and very keen anti-tobacconist, H. H. Tidswell, who regretted that he acquired the habit in the medical school of St. George’s Hospital, considers that “it may truly be described as suicide or self-destruction by early instalments,” and regards it “as a form of narcophilia which may soon develop into narcomania, dulling the intellect and poisoning their wives by their smoky breath, thereby causing sterility,” thus recalling the lines in the well known “Ode to Tobacco” which appeared in C. S. Calverley’s “Fly-Leaves.”

“How they who use fuses
All grow by slow degrees
Brainless as chimpanzees,
Meagre as lizards.
Go bad and beat their wives,
Plunge (after shocking lives)
Razors and carving knives
Into their gizzards.”

At the present time there is a vigorous anti-tobacco crusade in the United States of America, where, in 1913, it was calculated that the yearly consumption was 5.59 lb. per head of the population, as against 2 lb. in England. There is thus, as in other ways, a parallelism of the views held about alcohol and tobacco, but it is at least doubtful if prohibition in America will embrace weeds as well as wine.

Pipe-smoking is, of course, a very ancient way of using, or, as it was once expressed, drinking, tobacco, as the finds in prehistoric graves testify. Makeshift pipes of very various kinds, such as the rather grim utilisation of the thigh bone of a child or the more commonplace knuckle bone of a lamb, are described in “The Pipe Book,” by Alfred Dunhill.

Cigars of scents were smoked in India in the seventh century A.D., but the rolling up of tobacco leaves appears to have been initiated later, though it was in existence when America was discovered; Thevet in his

"Cosmographie Universelle" (1575) gives an illustration of Indians smoking cigars shaped like cornucopias. Cigar-smoking was popularised in England by officers who learnt it in Spain during the Peninsular War (1808-14), and cigarettes were similarly brought from the East as a result of the Crimean War (1854-56), but did not become really common until 30 years later. The first well-known man in society to smoke cigarettes was Laurence Oliphant (1829-88), the brilliant mystic and author who brought the habit from Russia. The influence of war is shown by the much greater frequency of women smokers during and since the Great War and as perhaps an aftermath the recent action of some railway companies in relaxing the regulation against smoking in waiting-rooms and labelling some carriages "non-smoking."

Tobaccos vary considerably in their nicotine content; Cavendish tobacco contains 4.15, Latakia 2.35, and mild honeydew 1.6 per cent. According to *The Lancet's* analysis, pipe mixtures have the highest nicotine content, and British cigars a higher than Havana. The nicotine content of the tobacco and of its smoke, however, do not vary directly, the way in which the tobacco is smoked and the degree of combustion being the important factors; thus Virginian cigarette tobacco contains (1.4 per cent.) nearly twice as much nicotine as Manila cigar tobacco, and yet the cigar smoke contains more than double the amount of nicotine in the cigarette smoke (Dixon); the smoke of Virginian cigarettes contains 0.06 per cent. only of its nicotine content when smoked as a cigarette, but when burnt in a pipe 37 to 53 per cent. of its nicotine content. The degree of combustion is most complete in cigarettes of all kinds, least in a pipe, and midway in the case of cigars. In pipes as much as 70 to 80 per cent. of the nicotine in the tobacco may pass into the smoke; a good deal, however, turns on the length of the mouth-piece; a long pipe is, therefore, better than a short one; thus a clay pipe or a churchwarden allows the nicotine to condense in the stem to such an extent that very little passes into the smoke. As the nicotine collects in the moist area of the cigar behind the burning tip, and may, if it does not undergo complete combustion, be carried into the mouth by the hot smoke, a thick or moist green cigar is more harmful than a thin or a dry one, and the bitter end should be abandoned and a half-smoked cigar not re-lit. It has been stated that a smoker who re-lights a pipe or cigar absorbs more poison than he would from ten ordinary smokes (Kionka). According to Dixon the smoke of one cigar contains as much nicotine as 12 to 18 cigarettes.

Is Tobacco-Smoking an Addiction?

Is tobacco-smoking an addiction? Opinion on this point may differ. Prof. W. E. Dixon, who says that the inveterate cigar-smoker must continually be absorbing a small quantity of nicotine to keep his nervous system in a comfortable state, and that the constant cigarette consumer feels the need of carbon monoxide, denies that smoking is an addiction. This question turns on the meaning attached to the word "addiction," and may therefore be a verbal problem. The Ministry of Health's Departmental Committee on Morphine and Heroin Addiction (1926) defined an addict as "a person who, not requiring the continued use of a drug for the relief of the symptoms of organic disease, has acquired, as a result of repeated administration, an overpowering desire for its continuance, and in whom withdrawal of the drug leads to definite symptoms of mental or physical distress or disorder." That smoking produces a craving for more when an attempt is made to give it up, as Charles Lamb has so graphically described in 'The Confessions of a Drunkard,' is undoubted, but it can seldom be accurately described as overpowering, and the effects of its withdrawal, though there may be definite restlessness and instability, cannot be compared with the physical distress caused by withdrawal in morphine addicts. To regard tobacco as a drug of addiction may be all very well in a humorous sense, but it is hardly accurate.

Therapeutic Uses of Tobacco-Smoking.

During the Plague of London smoking was regarded as a sure protection against the disease, and women and children and boys at Eton had lessons in this prophylactic measure; even now some smokers proclaim that smoking immunises them against influenzal infection; it is true that *in vitro* tobacco smoke has a bactericidal effect which persists after filtration through cotton-wool, and so, as nicotine is thus removed is due to other bodies, such as pyrrhol and formaldehyde. But in the mouths of smokers Puntoni found that tobacco smoke has very slight bactericidal powers even for micro-organisms with very little resistance to antiseptics. In the past tobacco as an enema was employed to relax muscular spasm (and is still so used in India to-day) so as to allow a dislocation to be reduced, and with rather less reason—i.e., its antiseptic properties—as an external application for many other conditions, such as wounds and ulcers, erysipelas, the itch, syphilis, and cancerous growths; and to relieve pain in rheumatism and after operations. Infusion of tobacco has occasionally been used as an abortifacient, and in Germany young women are stated to seek employment in tobacco factories with this object in view. The spasm of bronchial asthma may be reduced by smoking, but only when it is carried to a nauseating degree. Tobacco has dropped out of the *British Pharmacopæia*, but it certainly has its uses, especially as a sedative, as every smoker knows; it may act as a charm for the fidgets. I remember a lady in a small Scots village who only got relief from the post-prandial fidgets by smoking one of her husband's pipes, and was hard put to it to conceal this method from her servants when they came into the room unexpectedly.

Bad Effects of Tobacco-Smoking.

Just as many more therapeutic uses than are now recognised have been ascribed to the use of tobacco, so, as has already been mentioned, have numerous evil effects been referred to its abuse. Now as tobacco smoke contains nicotine, carbon monoxide, and pyridine bases, and as it undoubtedly has a familiarly striking effect on raw youths, it must be acknowledged that it, may have evil effects. Some of them will be mentioned, but considering the universality of the habit and the large number of heavy smokers, the comparative rarity of undoubted lesions due to smoking is remarkable. In this respect there is a great contrast between the price paid by those who smoke and those who drink alcohol to excess. It has sometimes been argued that these methods of meeting the need for narcotics go hand in hand and that smoking leads to alcoholic indulgence, but probably few smokers would admit this indictment, and, indeed, the contrary may well be argued—namely, that as a sedative and narcotic the popularity of the tobacco habit has ousted alcoholism. But there can be little doubt that the injurious effects of excessive smoking are materially augmented by, if not in part due to, simultaneous alcoholism.

Nervous System.

Nicotine exerts, as Langley showed, a definite action on the nerve cells in the path of the autonomic nerve-fibres, first exciting and then paralysing them. It is therefore to be expected that smoking will, in virtue of the nicotine and the carbon monoxide contained in the smoke, affect the nervous system, and a large number of manifestations occur in disposed persons. Binet, from a review of experimental observations, concludes that tobacco exerts a toxic effect on the brain. Muscular tremor, similar to that of Graves's disease or senility, can in some individuals be produced with the regularity of a laboratory experiment, and, as in the case of vertigo, have been ascribed to chronic poisoning by carbon monoxide; in others jumpiness and irritability, or neuralgia, vertigo, insomnia, or headache are produced.

An important question is the influence of smoking on the higher intellectual centres; after a transient preliminary stimulating effect on mental processes, during the act of smoking, its sedative effect develops. It is

rather alarming to find that in America 2,000 psychological tests on medical students showed that smoking lowers mental efficiency in from 10 to 23 per cent., and especially in imagery, perception, and association. Adolphe Abrahams, while recognising that these tests may not be conclusive, believes that smoking diminishes the general capacity for work, impairs memory for names, and renders sleep less refreshing; and Turney, who admits to being a moderate smoker, considers that some of the indolence, dreamy apathy, and premature senility often seen in heavy smokers is due to their indulgence. He also refers to migraine and epileptic fits being increased by smoking and disappearing when the habit is abandoned. That psychoses are definitely due to excessive smoking is probably rarely, if ever, true; more often the constant smoking is a manifestation of the neuropathic constitution. But it would be difficult to deny that abuse of tobacco may not do harm to a neuropathic person, and so be a contributory factor.

Tobacco Amblyopia.

Tobacco amblyopia, with a central scotoma more marked for colours than for white light, is regarded by Gowers as probably due to a primary degeneration of the macular fibres with a secondary retrobulbar neuritis. According to de Schweinitz, moderate smokers of 60 or over, who have not altered the quality or quantity of their tobacco, may, after a long period of immunity, suffer from the characteristic papillomacular scotoma. While recognising the influence of the so-called cumulative effect of tobacco as a possible explanation, he regards this as unsatisfactory, and believes that sclerosis of the small nutrient arteries of the retina and optic nerves is a contributory factor. It is said that tobacco amblyopia is almost entirely due to excessive pipe-smoking, and that a foul condition of the pipe is an important, if not essential, factor; according to Weidler, though amblyopia is specially associated with the use of shag, it is but rarely solely due to smoking, alcoholism being an accessory, thus illustrating the action of two poisons combining to exert a powerful influence. Complete abstinence from both poisons and full doses of nuxvomica should lead to a cure, but relapse of the amblyopia may follow if the excessive use of the poisons is resumed. It is said that in tobacco amblyopia the dilatation of the pupil resulting normally on stimulation of the skin of any part of the body is either in abeyance or obtained only by increased stimulation (Dorrell).

Effects on the Heart.

On the heart the unpleasant effects of smoking may be divided into: (1) The "tobacco heart" of young smokers, characterised by palpitation, rapid action, and frequent extrasystoles. (2) Arrhythmia at any time of life and more noticeable after 50 years, when extrasystoles are common and more easily induced. The late Sir Clifford Allbutt wrote: "One case is known to us of a man whose general health is excellent, who is by no means a neurotic subject, and whose heart stands work well in all other respects, in whom intermittence of the heart may occur for many days if he remain for an hour or two in a room with many smokers. He dare not sit in a closed smoking-room or in the smoking compartment of a railway carriage. The intermittence may not begin until the next day, or the next but one, but then comes on with the certainty of a laboratory experiment; it gets worse during the next day or two, and then gradually passes off in a few more days. He never suffers from any cardiac disorder unless exposed to tobacco, but this proclivity has hung about him for many years. He has no dislike to the drug, nor does he feel any immediate discomfort from it." I have no doubt that he was here describing his own symptoms, and often thought of this when he hospitably handed cigarettes to his guests ignorant of his idiosyncrasy. For the possible comfort of smokers with extrasystoles it may be mentioned that coffee also causes extrasystoles, and that the effect of abstinence from coffee and perhaps tea, may be worth a trial before definitely deciding on "no tobacco." (3) Angina and anginoid pain due

to smoking are more often seen in the later half of life. Manifestations of the more severe form of angina are said to be rare. I have seen it in two doctors fond of cigars and have heard of others. It may be noted that nicotine, unlike adrenalin, constricts the coronary in addition to other arteries, thus offering a reasonable explanation of angina. Sir Clifford Allbutt, who was rather critical of the subject, especially of Huchard's hypothesis of spasm of the coronary arteries, had seen only three well-marked cases, and obviously considered that cases of true angina had been thus described; no doubt there is a merciful tendency to take this view if possible, and it may be comforting to quote Mauriquand and Bouchat's definite dictum that angina solely due to tobacco is never fatal, but the obvious difficulty is to be certain that a given case is entirely due to tobacco. The late Sir Richard Douglas Powell and others have classed the tobacco cases as vasomotor or false angina. Minor degrees of anginoid pains, such as substernal oppression and tightness on exertion such as to stop the patient in going uphill, are not uncommon. Attacks of syncope sometimes appear to be due to smoking. The pulse of smokers is usually somewhat faster than it is, or would be, when they have given up the habit, and the average pulse-rate in smokers is some ten beats a minute faster than in non-smokers.

A point of some interest is the effect of smoking on physical efficiency. The prejudice against smoking by athletes while training is very old, and, though it is open to discussion, seems still to be on the whole generally approved. From a statistical inquiry into 304 male students at the Antioch College, Yellow Springs, Ohio, Earp found that the non-smokers were more successful both in scholarship and athletics than the smokers. From inquiry from athletes I gather that the most successful are non-smokers, and that some, but not all, are convinced from their own experience that smoking handicaps them. Adolphe Abrahams, however, from very considerable experience of athletes is not convinced that tobacco alone makes more than the most trivial difference to an athlete who trains well in other respects. An old Cambridge Blue for the quarter-mile told me that he gave it up on one occasion for a few weeks without any improvement in his time, and that Sir Clifford Allbutt told him that in his experience it took six weeks to get the nicotine out of the system. The question might arise whether or not the popular belief that smoking impairs the wind is explicable as the effect of nicotine or, as might seem more probable, of carbon monoxide combining with the hæmoglobin and so paralysing some of the red blood corpuscles.

Blood Pressure.

Tobacco-smoking raises the systolic blood pressure from 5 to 20 mm. Hg., the diastolic pressure being less influenced; at the same time the rate of the heart is increased by about ten beats per minute. The rise of systolic blood pressure is transient, and after half an hour falls to normal or below. In moderate and habitual smokers who have acquired tolerance the fall of blood pressure is gradual and the soothing effect of tobacco probably compensates for the changes; indeed, apart from any other factors confirmed smokers tend to have a low blood pressure; this has been insisted on by Dr. de Havilland Hall, and according to the late Sir Lauder Brunton a systolic blood pressure of 100 mm. Hg. in a strong healthy man without any evidence of tuberculosis spelt excessive smoking in 19 out of 20 cases.

Alimentary Canal.

The effect on the stomach is important; X-ray bismuth meals have shown that after a short period of increased contractility the motility of the stomach becomes paralysed for an hour or so (Danielopolu); as the subjective feeling of hunger very probably depends on contractions, the relief of hunger by smoking may be thus explained; it is said that dilatation of the stomach may thus result.

On the respiratory tract, tobacco-smoking is responsible for pharyngeal catarrh which may spread to the larynx and bronchial tubes, causing cough, hoarseness, bronchial catarrh, and so emphysema of the lungs. The

irritating effect on the throat and upper air passages exerted by cigarette smoking has been ascribed to furofural, pyridine, and ammonia, and not to nicotine."

The Sir William Osler Memorial Volume.

WITH the passing of Sir William Osler, the world of medicine lost one of its greatest teachers, the world of science one of its most brilliant investigators, and the world of letters one of its most genial and pleasant writers. His essays and addresses to students are perhaps his greatest monument.

A biography by Dr. Harvey Cushing has already appeared, and was reviewed in our issue for last February, p. 97; but we are glad to learn that the American and Canadian Section of the International Association of Medical Museums is now about to publish a special Sir William Osler memorial volume. The following is an account of the forthcoming publication.

"The memorial volume which has been in course of preparation under the auspices of the International Association of Medical Museums during the past five years (representing its Bulletin No. IX) is now complete and has been issued. It comprises a large series of appreciations and reminiscences of Sir William Osler, arranged in biographic sequence under the different periods of his career, written by over a hundred colleagues, friends and pupils, and is prefaced by charming introductory articles by Professor Wm. H. Welch and the late Sir Clifford Allbutt, outlining the scope and plan of the work. It thus presents a valuable contribution, from first-hand evidence, to our knowledge of those early cultural influences and researches which militated so largely to Osler's development as a master of medicine, and of all the varied activities of his later many-sided life. At the end there is a complete bibliography of Sir William Osler's publications (based on the chronological bibliography by Miss M. W. Blogg) followed by a bibliography of 'Writings about Osler.' The Osler bibliography is as complete as the labour of several efficient collaborators can make it and has been extensively annotated in accordance with his expressed preference for 'a combination of biography and bibliography' . . . 'to be of value to the full-fledged student of to-day a bibliography should be a catalogue *raisonné*, with judicious remarks and explanations. . . . ' (1918), and its addition to the memorial articles here assembled makes this a work of great biographic interest and significance.

"The volume is handsomely bound in cloth and contains some 80 illustrations in photogravure engravings, half-tone prints and line cuts, and some 700 pages of memorial contributions and bibliographical notations. The present edition of 1,500 copies is being privately issued by advance subscription and with the aid of a publication fund inaugurated in January 1921, by initial contributions from the National Research Council (Washington), the late Sir Edmund Osler and Mr. Justice Featherstone Osler (Toronto), Mrs. K. S. Reford (Montreal), and others. The price of the bound copy is \$10.00 and subscriptions to it, or contributions of a larger amount to the publication fund are still needed and are invited. Advance subscribers for more than a single copy are published on the list of 'Subscribers to the Publication Fund' at the back of the volume, and 'Presentation' copies with complimentary cards are sent, if desired, direct from the publishers to addressees to the extent of such subscriptions at the rate of \$10.00 per copy."

Medical men in India, as a class, are not too well able to afford to buy expensive books; but there must be many a medical man in India to whom Sir William Osler's teaching and essays are a treasured memory, and who will look forward to this volume. A copy should be in every medical library in India, for Osler's life and his example are among the finest in the history of medicine, especially of clinical medicine and of medical education. Orders for the volume with cheques should be

sent either to Sir Humphrey Rolleston, Bt., K.C.B., 55, Upper Brook Street, London, W.1, for England; or for America to Dr. Charles F. Martin, Dean of the Medical Faculty, McGill University, Montreal, Canada.

The Quarterly Review of Biology.*

OR the introduction of new journals, there is no end. Yet the new *Quarterly Review of Biology* is a journal for which there is a great need, and one which will be of great interest to medical men. Biology is perhaps the most fundamental science of all in the understanding and study of medicine; we may know, for example, that a given drug is of value in a given disease; but until we know how it acts, how the living cell utilises it, and what the mechanism of cellular and tissue defence against the progress of the disease is, we are working in the dark. Biochemistry is to-day becoming of ever greater and greater importance in medicine; yet there is too much of a tendency to stress its chemical as against its biological side.

In the first place the new quarterly review is excellently got up and printed. Secondly, it is issued from the Johns Hopkins University and its editorial staff and advisory board include all the pioneers of biological work in the American universities, including Harvard, Yale, Columbia, and California. Its editor is Dr. Raymond Pearl, the well known biologist and statistician; its associate editor, Dr. R. W. Hegner, one of the best known biologists and protozoologists in America. In an editorial Dr. Raymond Pearl makes a modest apology for the appearance of still another new journal. It is to-day admittedly true that no one medical man can keep abreast of all the literature bearing upon his subject; he can only make a judicious choice; and here the abstract journals and such works as the quarterly *Index Medicus* are of great assistance. Yet, in the struggle of man to wrest the secrets of Nature, it is essential that his armamentarium shall be as complete and as efficient as possible. Hence the necessity for such technical and scientific journals as this. At any step the scientific worker may need information upon a biological problem; he will then turn to the great biological journals for information. Text books are of value; but the information in them is usually about ten years old, and too condensed to be of value to the research worker.

Vol. I, No. 1, was issued in January 1926. C. R. Moore deals with the biology of the mammalian testis and scrotum, an article which deals at length with the effects of vaso-ligation, and the fate of testicular grafts, and ends with a most useful bibliography of no less than 212 papers. Dr. L. R. Cleveland contributes a most interesting article on symbiosis among animals, with special reference to the intestinal flagellates of termites; as is now well known certain races of termites would die of starvation but for their intestinal protozoa; these protozoa predigest the diet for the termite host. The paper is admirably illustrated. S. R. Detwiler gives an account of experimental studies on morphogenesis in the nervous system, and K. F. Kellerman a review of photoperiodism—the influence of the length of daily light periods upon the growth of plants. A. A. Schaeffer gives a very interesting account of recent discoveries in the biology of the amœbæ, dealing with modes of movement, nuclear structure, effects of heat and of other external stimuli. Finally the number closes with a long series of short reviews of new books classified under different headings.

The new quarterly review is a splendid production. It will be a necessity to every biologist, and in every large medical and scientific library. The range of subjects covered is very large, and the standard of authorship very high. Biology has come more prominently

* *The Quarterly Review of Biology*. Published by the Williams and Wilkins Co., Baltimore, U. S. A. English agents, Baillière, Tindall and Cox, London. Annual subscription 21s. net. Vol. I, No. 1, January 1926; pp. 137, with 8 plates and 99 text figures.

to the front in America perhaps in recent years than in any other country, and the new review is worthy of the very best standard of American scientific work and workmanship.

"Health and Empire," A New Quarterly Review.*

We have not infrequently commented in our columns upon the excellent work of the British Social Hygiene Council—a body with a vigorous policy aiming first at the eradication of venereal diseases throughout the Empire or their limitation, secondly with other infectious diseases. In pursuance of their object, the Council have now commenced the publication of a new quarterly review under the above title, the first number of which appeared in March 1926. This new venture is addressed not only to medical men but to social workers, administrators, and the general public. It will act as a clearing house for the collection and dissemination of experience gained all over the world as to the best methods of controlling venereal diseases, and of educating the public; new developments in psychology, biology and physiology will be brought into relationship with special social problems; and reviews will be published by experts of new publications and official reports.

In the first number Professor Leonard Findlay writes on the treatment of the pregnant mother in the prophylaxis of congenital syphilis; Professor Cyril Burt deals with the contributions of psychology to social hygiene; Mr. C. J. Bond, F.R.C.S., with the attitude of the State and society to venereal disease; and Professor Percy Nunn with education and tradition in relation to social hygiene. Further contributors to the journal are Sir Arthur Newsholme, Professor Julian Huxley, Dr. Hadfield, and others well known in medical and public health circles in Great Britain, as well as contributors from the Continent and from different parts of the Empire.

This new review should be of interest, not only to the medical but also to the lay public, and to all workers in social hygiene.

The Malayan Medical Journal and Estate Sanitation.†

We must extend a welcome to this new local contemporary medical journal, the first number of which was published in January 1926. Its editorial staff is a strong one, and consists of Dr. T. S. Macaulay, M.D., D.T.M., Dr. G. B. McHutchison, M.D., D.T.M., Dr. J. J. Hicky, M.D., and Dr. W. Thunder, M.D., B.Ch., D.A.O. In an introductory editorial the editor remarks that, although there are already several journals dealing especially with tropical medicine, yet there has hitherto been none published in the F. M. S., and none with a purely local interest. Three classes of readers are considered; first the local medical men to whom local medical news and abstracts from current literature will be of value; secondly the hospital assistant and dresser class who required simple, accurate, and up-to-date information about the chief tropical diseases, but not abstruse information about rarer diseases which they never encounter; thirdly the planting community, to whom good sanitation means a healthy and contented labour force, and increased dividends. There is therefore ample room for the new venture.

In the first number Dr. Galloway deals with inguinal lymphadenitis, its chief causes and treatment, being a

paper read at the annual meeting of the Malaya Branch of the British Medical Association. Dr. Macaulay deals with the treatment of pneumonia, concluding that sera and vaccines may be of value, but that reliance must be put on stimulant and symptomatic treatment. In the section dealing with an "Inside View of Estate Health," special articles are contributed on malaria as an estate problem, gonorrhoea, and on estate dressers. Drs. Stanton and Fletcher contribute a study of melioidosis, and Dr. Fletcher a long and very interesting article on the treatment of malaria with cinchona febrifuge. A selection of current topics, and minutes of the Malaria Advisory Board and of the Public Health Education Committee conclude the number. We wish our new contemporary every success.

Cardio-Aortic Syphilis and its Treatment

By THOMAS F. COTTON,

Physician to Out-patients, National Heart Hospital.

(British Med. Journ., May 22, 1926, p. 855.)

ANALYSIS of the symptoms of 200 cases under continuous observation for a number of years shows nothing really distinctive from another group with aortic disease of rheumatic origin. A certain number, sooner or later, had symptoms of heart failure with congestion,—breathlessness at rest, hepatic engorgement, and other signs of increased pressure in the venous system. Auricular fibrillation with a rapid ventricular rate may occur but a normal rhythm is the rule. A few have subacute infective endocarditis. A larger group had breathlessness on slight exertion, precordial pain, palpitation, giddiness, fatigue and undue exhaustion. There is a third group, much smaller than one would expect, the chief complaint of which is pain that is anginal in character and distribution.

The physical signs of cardio-aortic disease of syphilitic origin are in some cases those associated with heart failure of the congestive type—pulmonary congestion, engorged veins in the neck, hepatic engorgement, renal congestion, etc. There is nothing in this type of failure which indicates the syphilitic origin of the disease. Identical signs occur in aortic disease of rheumatic origin. All degrees of enlargement are seen. The diastolic murmur in some can only be recognised by listening carefully to the left of the sternum at the level of the third interspace, and sometimes the patient must be placed in a horizontal or left lateral position and the murmur listened for at the end of expiration.

In many patients with free aortic regurgitation a presystolic rumble is heard at the apex. This murmur may be accompanied by a thrill over the mitral area. Aortic stenosis can be diagnosed when a systolic thrill is felt over the aortic cartilage. When possible the diagnosis of aortic dilatation or aneurism should be confirmed by x-ray examination of the chest. A normal rhythm is present in the majority; auricular fibrillation in a few; extra-systoles are common.

Effect of Specific Treatment in Cardio-Aortic Syphilis.

An unselected group of 58 cases was given specific treatment. An approximately equal number of control cases was selected, closely resembling in age, symptoms, and signs, the group of treated cases. The treated cases were given each year a series of 6 to 8 intravenous injections of novarsenobillon 0.6 gram at weekly intervals. An initial dose of 0.3 gram was given before beginning treatment as a safety measure.

A few patients complained of breathlessness after the injections; these were of a nervous type, and no attention was paid to this symptom. Others felt giddy and some fainted, but these gave a past history of giddiness and syncopal attacks. These symptoms were looked upon as vaso-vagal in origin, and not an indication to discontinue treatment. Mercurial inunctions were prescribed at each monthly out-patient visit, and the patient was instructed how to apply the ointment.

Potassium iodide, 10 grains thrice daily was given to all. General tonics were substituted for the mercury and potassium iodide in the control cases and novarseno-

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† *The Malayan Medical Journal and Estate Sanitation*. Published quarterly. Kuala Krai, Kelantan, Malaya. Annual subscription, 6 dollars; post free.

hillon was withheld from them. No appreciable change in the physical signs or symptoms in these patients could be detected as a result of treatment. The average age at death in the treated cases was 45 years, and in the untreated cases 43 years—a difference of two years. Of the treated cases 14 (24.1 per cent.) have died, and of the untreated 19 (33.9 per cent.) a difference of 9.8 per cent.

Dr. Cotton thinks it justifiable to conclude that specific treatment is indicated in syphilitic cardio-aortic disease; that no danger is attached to the intravenous injections of arsenic in moderately large doses given without any special precautions; and that arrest in the disease, as shown from the after-histories of cases treated, may be due to specific treatment given over a period of 5 years.

Angina Minor.

By JOHN HAY, D.L., M.D., F.R.C.P., (Lond.),
Professor of Medicine, Liverpool University.
(*British Med. Journ.*, 10th July, 1926, p. 51.)

THERE is a certain haziness, as to the significance of the pains in the precordial and substernal regions. Dr. Hay made careful notes of 472 patients suffering from angina, mostly private patients. In the latter part of the nineteenth century it was the physical signs of heart disease which occupied the minds of the profession. Now the cross-examination of a patient is often considered even more important than the physical examination.

Symptoms often precede physical signs. Sir James Mackenzie more than any other focussed attention on the subjective aspect of disease. Pain is of the nature of a protective reflex. The full blown stark anginal seizure cannot fail of recognition. It is otherwise with the earlier manifestations and it is these less obtrusive indications which Dr. Hay discusses.

Sir James Goodhart said "Angina is common among us if we are on the look-out for the milder forms." Minor angina often is a premonitory symptom but one full of significance. Most patients who suffer from major angina give a history indicating that for some years previously there were larval manifestations.

Major and minor may alternate irregularly in the same patient. In both forms of angina the symptoms result from cardio-vascular inadequacy. Of these symptoms the commonest is substernal discomfort or pain on exertion or exposure to cold. It is described by the patient as "a sense of oppression," "tightness," "constriction," a "feeling of weight," sometimes merely as "emptiness."

The site of the sensation is substernal, often in the middle or upper third, but it may be most marked at the lower third of the sternum, and sometimes even in the epigastrium. This feeling is most commonly referred to by the patient as "indigestion."

The pains of angina are continuous and persistent, increasing if the effort which induced them is continued and tending to cease when the patient rests.

The causes which induce anginal pain are such as to bring about a rapid strain on the arterial side of the circulation and especially on the left ventricle. In a large proportion of anginal patients there is a lesion of the coronary arteries or persistent hyperpæsis.

During an attack of angina major there are accompanying pains or unpleasant sensations which may be felt in the back between the scapulae, in the shoulders, arms, neck, jaw, even in the face and eyes. So in milder angina these radiated pains may prove of the greatest help in recognizing significance of indefinite substernal discomfort.

There may be an entire absence of complaint of pain in the chest. A common form of related pain is a dull ache in the shoulder or arm. These erratic anginas are brought on by effort or exposure to cold and are relieved by rest and warmth. Accompanying these substernal sensations of angina minor there is sometimes a sense of

foreboding. This anxiety bears no relation to the degree of pain but is most characteristic.

A typical example of angina minor is the following case:—

A man, aged 64, complained of gripping pain of moderate intensity and a sensation of pressure, unaccompanied by dyspnoea. The pain was substernal, and covered an area the size of a crown. It was induced by walking and ceased at once when he stood still. If he persisted, pain and numbness appeared in the left forearm and hand. He had suffered in this way for two years, and had been under continuous treatment for "indigestion."

The most satisfactory classification is that into two groups; (1) anginal pain due to some essential disease of the cardio-vascular system, primary angina; and (2) the group in which all evidence of such cardio-vascular disease is absent, but where there is some factor outside the circulation which has caused a lowering of the threshold to pain, or which has depreciated the efficiency of the myocardium.

The chief pathological changes in the primary anginas are diseases of the myocardium, with or without frank coronary narrowing; arterio-sclerosis, with or without high blood pressure; and lastly, valvular disease, more particularly of the aortic orifice, often associated with aortitis.

In the secondary group of anginas the possible factors are sub-infections or other causes of toxæmia, the climacteric, prolonged worry, anxiety, overwork or any factor causing neurasthenia. After cross-examination of the patient in regard to the pain, and after having decided that it is cardiac in type the whole cardiovascular system must be passed under review in order to determine first whether a diagnosis of primary angina is justifiable, and the extent of the damage.

When there is valvular disease it is practically always the aortic orifice that is affected. In an analysis of 309 cases of angina pectoris only 35 showed disease of the valves, and, with one exception, the aortic valves were damaged. There was aortic regurgitation in 26, and some degree of aortic obstruction in 10 patients. The symptoms are not those of valvular disease with cardiac failure, they are symptoms of angina.

Arterio-sclerosis is a common feature, the condition of the arteries should be noted, especially those of the retina; when possible the aorta should be x-rayed. The blood pressure is unduly high in about half the cases, and some amelioration is to be expected when the hypertension is modified. A marked rise in the diastolic pressure is of special significance. Any drastic reduction of blood pressure is unwise in the interests of the patient. It is rare to find any change in the fundamental rhythm of the heart.

It is important to determine the factors which induce the pain, more particularly the nature and severity of the effort—that is, to estimate the amount of cardiac reserve; not only the cardiac response to effort should be noted, but the constancy of that response. It is satisfactory to find in any patient that there are days when he can do with ease that which on another day causes pain, for such patients prove more amenable to treatment.

When there are no clear evidences of cardio-vascular disease, a careful survey should be made to discover, if possible, anything which may be lowering the threshold to pain. First, any toxic cause, such as a grumbling appendix, oral sepsis, sinus disease, or some pulmonary, renal, or alimentary disorder; further, worry, anxiety, overwork, or insufficient sleep, are quite likely factors.

In the absence of syphilis or valvular disease of the heart, primary angina is rare under the age of 45 and it is unwise to make such a diagnosis in the young if neither aortic disease nor an abnormal blood pressure is present. Too often a correct diagnosis of angina is refused because on physical examination either nothing abnormal is found or there is only a moderate degree of enlargement.

Pain in the region of the heart is a common complaint in most patients with valvular disease, and in young

males presenting the symptoms of the "effort syndrome." This pain though cardiac in origin, is not "angina," it is submammary and often felt directly over the cardiac thrust.

It is often quite independent of effort and may be accompanied by troublesome palpitation. If the pain does extend into the arm it is nearly always diffuse, involving the whole arm and often both arms, when the pain is bad there may be great nervous excitement followed by nervous prostration. In primary angina cessation of an attack as a rule leaves the patient comfortable.

The prognosis is difficult in major angina; it is doubly so in angina minor. It is the integrity of the myocardium and the soundness of the arterial tree that matter; primary angina of the minor type is more serious than secondary angina minor. The more the threshold for pain is below normal, the better the outlook. There is further reason for optimism when subinfections, mental worry and strain, insufficient sleep, and factors of this kind can be treated. Persistence in the liability to pain and discomfort in spite of treatment is an unsatisfactory feature, especially if combined with cardiac embarrassment accompanied by enlargement of the heart. A high blood pressure does not appear to add to the gravity of the prognosis. The figures for all anginas gave the average duration of life from the first appearance of pain as four and a quarter years in the high pressure cases (180 mm. Hg. and over), and three and a half years in the group with pressures under 180 mm. Hg.

When there is a clear history of syphilis the prognosis should be guarded until antisyphilitic treatment has been carried out, for occasionally the improvement is marked. Potassium iodide in massive doses is not enough; the patient should have 2 courses of intravenous novarsenobillon and prolonged mercurial treatment.

A damaged heart necessitates a sheltered life, and the reasons for the restrictions advised should be frankly explained to the patient. When syphilis is a factor, appropriate antisyphilitic treatment is imperative. An attempt should be made to bring the bulk of the body, when it is excessive, within normal limits. Careful dieting should be carried out and the results noted. An abnormally high blood pressure can sometimes be modified with definite relief. Much can be done in the secondary anginas when the cause of the lowered threshold to pain has been discovered. All possible sources of persistent low-grade infections should be investigated and radically treated—dental sepsis, sinus disease, abnormal intestinal conditions, pyelitis, chronic appendicitis.

An attempt must be made to eliminate worry and make sure of sleep. For this a mixture of ammonium bromide and phenazonum is especially helpful. Mental strain and irritations should be obviated as far as possible.

Diet and Disease with Special Reference to the Teeth, Lungs, and Prenatal Feeding.

By EDWARD MELLANBY, M.D. (Cantab.), F.R.S.
(*British Med. Journ.*, March 20, 1926, p. 515.)

EXPERIMENTAL work on animals and clinical observation has brought to light the fact that the dietary of the people of the United Kingdom is defective in two important respects:—(1) that it includes too little of the substances which contain fat-soluble vitamins, and (2) that it contains relatively too much cereals. One of the fundamental effects of a fat-soluble vitamin is to stimulate calcification of bones and teeth, while on the other hand, excess of cereals in the diet interferes with the calcification of these organs. The meagreness of the sunshine in England and its poor quality so far as ultra-violet radiations are concerned serve to make matters worse.

If the fundamental cause of dental defect is that the dietary of the people is exceptionally low in calcifying properties, then the teeth ought to be badly formed. The test can be made at once.

A very large percentage of human deciduous teeth are badly formed, and not the 2 or 3 per cent. as usually stated. Children's deciduous teeth in England are not only very susceptible to caries but they are of very defective structure.

According to the experimental work of May Mellanby the more the fat-soluble vitamin and the less the cereals eaten, and the greater the exposure of the animal to ultra-violet radiations, the better formed will be the teeth. How do these facts bear upon the widespread scourge of caries in the teeth of children?

To attack the point in a direct fashion the following preliminary investigation was made by May Mellanby, C. Lee Pattison and J. W. Proud.

A number of children in an institution were placed on diets which, according to animal experiments, varied in their effect on calcification. Group A were given a diet which contained much milk and some cod-liver oil, less cereal (none of it oatmeal), in addition to other food-stuffs. The diet of Group B contained less milk, more cereal (including oatmeal); while in the case of Group C an intermediate diet from the point of view of calcification, and one which was usually the standard diet of the institution, was given. The children were arranged in groups so that the average age of each group was about the same. Before the diets were started the mouth of each child was carefully charted, the amount and type of hypoplasia, the carious points, the extent and degree of hardness, the missing teeth, etc., being noted. After seven and a half to eight and a half months of the diets the condition of the teeth was again charted, and it was found that there was nearly four times as much new caries per child on diet B as in the diet A group.

It is generally accepted that the feeding and nutritional condition of a mother during pregnancy modifies the metabolic changes and consequently the well being of her offspring.

In the case of rickets the maternal factor has appeared so important to some that heredity has even been advocated as the prime cause of this disease. This view has not, however, received much support.

In experiments on dogs it was found that if bitches were fed during pregnancy on diets which in the case of puppies will lead to rickets, then the offspring have a greater tendency to develop this disease. This tendency in the young is not removed by a period of good diet, but may become evident again at a later period of defective feeding.

In a series of 330 dogs it was found that there was a close relationship between the fat-soluble vitamin content of the diet and the susceptibility of the animal to develop an inflammatory condition of the lungs. All the cases of bronchopneumonia were found in dogs whose diets were deficient in fat-soluble vitamin, and no bronchopneumonia developed when the diet contained either butter or cod-liver oil. Except for the variable amount of fat-soluble vitamin, the diets of these animals would formerly have been considered good—that is to say, they contained an abundance of protein, fat, carbohydrate, and energy. It is to be doubted whether any ordinary diet can be so low in calcium content as to lead to defective calcification of the body tissues if cod-liver oil is also ingested at the same time. On the other hand, when butter is the source of fat-soluble vitamin in the diet it is essential, in order to produce well formed teeth and bones, strongly contracting muscles, and good general activity, that the diet should also be richer in calcium. The reason for this is probably that butter contains a much smaller amount of antirachitic vitamin than cod-liver oil, so that the butter effect on calcification is best seen when there is plenty of calcium in the diet.

Another condition which commonly develops in puppies when feeding on diets containing excess of cereal and a deficiency of fat-soluble vitamin is diarrhoea.

Clinically also it is probable that chronic catarrh of the respiratory passages of children, tendency to bronchopneumonia, rickets, attacks of diarrhoea, and later enlarged tonsils, are intimately related.

Dr. Mellanby summarizes his findings as follows:—

(1) It has been shown experimentally that these defects in the maternal diet increase the tendency of the offspring to develop rickets.

(2) The same defects in the diet seem to increase the susceptibility of young animals to bronchopneumonia and inflammatory conditions of the respiratory tract, and in general, to result in puppies of lowered vitality.

(3) It is well known that the catarrhal child may develop this condition shortly after birth, and that it has a great tendency to become rachitic and to develop bronchopneumonia.

(4) Puppies which develop rickets when feeding on these experimental diets frequently develop a catarrhal condition of the alimentary tract sooner or later, the time seeming to depend partly upon the kind of feeding of the mother and the puppy in the pre-experimental days.

It is probable that certain defects of diet of women during pregnancy and lactation are responsible for some, and possibly much, of the illness and mortality of young infants.

Laxatives and Purgatives.

By CHARLES W. CHAPMAN, M.D., M.R.C.P.

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(*Practitioner*, May 1926, p. 346.)

THE individual not being an assemblage of standardised parts, irregular action of the bowels has to be treated in different individuals in different ways. In a recent controversy on the question of the action of the bowels, one well-known authority stated that a daily action was unnecessary, whereas others advised two actions daily.

The fact is that the normal in one person is abnormal in another. In like manner the consistence of the excretion varies; in one perfectly healthy person it will resemble that of a dog, in others that of a cow.

Generally speaking, a copious evacuation of a consistency not calling for excessive straining is the ideal one. The question then is how is the ideal to be reached? Regular and efficient action of the bowels, like most good habits, calls for early and persistent training from the nursery period to adolescence. With children, especially, the common faults are over and too frequent feeding whereby the digestive organs do not get their proper rest. The old myth, "teething" is still with us, the truth being that teething is a natural and painless process provided the stomach is in healthy state. Why do "teething powders" relieve the sick child? Simply by getting rid of irritating and unwholesome material. How often does one find the pain from a carious tooth relieved by a purgative!

In older children the temptation is to resist the call of nature if it interferes with games or other pleasures. If this thwarting of nature is persisted in the first step into the habit of depending upon aperients has been taken. The other salient points to be observed are:—

(1) Food appropriate to the child's age and constitution. Parents too frequently give the child the same food as they themselves eat. This improper feeding accounts for fully half of children's ill-health; the giving of chocolates or other sweets at odd times, specially after being put to bed, is another cause of ill-health and carious teething, and bad temper.

(2) Hurried meals are a fruitful cause of constipation, general mal-nutrition, and, again, bad temper. This is true at all periods of life. Patients should be reminded that Nature has not provided the human species with a gizzard. The valuable habit of thorough mastication must be begun in the nursery and carried on well into adolescence. Too often a child is reproved by the mother or the nurse for "always being last" over its meals; whereas he ought to be commended for it. This bolting of the improperly masticated food is facilitated

by copious draughts of fluid during the meal. By strictly limiting the amount of fluid taken during meals mastication becomes imperative; unless the bolus is sufficiently softened by saliva, swallowing is impossible. The necessary amount of fluid can be taken well between meals whereby the contents of the bowels have sufficient moisture, and the requirements of the body are met. The inclusion of fresh fruit and vegetables in the daily menu is important, both for general nutrition, and as an aid to intestinal peristalsis.

(3) The importance of walking exercise at all ages is likely to be lost sight of with modern facilities for riding. There can, however, be no doubt of the value of walking in aiding the portal circulation and intestinal peristalsis.

In adults, especially after middle life, the possibility of malignant disease of the bowel being the cause of either constipation or diarrhoea should be always borne in mind. In the earlier stage of cancer the appearance of the patient does not suggest that disease, and it is just then that most benefit may be derived by operation.

The author was once asked to see a lady 76 years of age for persistent diarrhoea, which had hitherto resisted treatment. So frequent were the actions that a diaper had to be worn. Rectal examination revealed a loaded rectum, the faecal mass being so hard that it had to be broken up with the handle of a spoon and removed piecemeal. When a route for the passage of an enema tube had been made warm olive oil was injected and the rectum cleared. Laxatives were prescribed and the patient made a complete recovery. If these and similar mistakes are to be avoided the golden rule, "When in doubt examine the rectum" must be followed. It should be remembered that both constipation and looseness of the bowels may occur in connection with cancer of the rectum.

We have been considering the usual causes of constipation, its prevention by early training, judicious feeding, outdoor exercise, and the taking of fluid well between meals and only in extreme moderation with food. We may now inquire, given that an aperient is needed, in what form it should be prescribed, always bearing in mind our goal—the restoration of natural action independent of the use of drugs. It is this which distinguishes a skillful doctor from a quack.

Aperients may roughly be classed as purgatives and laxatives. The former act mainly as irritants by stimulating the flow of mucus and increasing peristalsis of the bowel, the latter have a somewhat similar but more gentle and lasting action, which is favourable to the restoration of the natural functioning of the bowels. The habitual use of strong purgatives is apt to clear away good material along with the useless, to the lowering of the general nutrition. The too-effectual action of cathartics keeps the lower bowel empty, and the purging habit having been formed, the stimulus to reflex action is removed. Salines such as the sulphates of sodium and magnesium, though useful at times, are not applicable in cases where masses of scybala are present since they are prone to cause only watery motions while the lumps may be left undisturbed. The stronger aperients, such as jalap, are often called for in cardiac dropsy by virtue of the watery motions they produce. Laxatives, on the other hand, are not open to the objections just referred to. Fortunately there are many such remedies available, alone or in combination with others, suitable to most cases, though the selection in individual instances will at times severely tax the medical attendant's therapeutic acumen.

The most reliable laxative is senna, alone or in combination with tartrate of sodium and carminatives. A useful formula is *conf. piper. nig.* (B. P.), $\frac{1}{2}$ oz.; *conf. sulphuris* 1 oz.; *conf. senna* 3 ozs.; one to two teaspoonfuls to be taken each night. Instructions should be given that after one copious action, sufficient to produce but one easy evacuation daily should be taken. Infusion of senna pods is also efficient and harmless. Cascara, with or without small doses of the extracts of nuxvomica and belladonna, makes a useful pill in obstinate cases. Castor oil and petroleum are useful laxatives.

The Treatment of Strictures of Large Calibre by Means of Kollmann Dilators.

By H. L. ATTWATER, M.Ch., F.R.C.S.,

Hony. Assistant Surgeon to All Saints' Hospital for Genito-Urinary Diseases.

(*Practitioner*, No. 697, Vol. CXVII, No. 1, July 1926.)

THE author points out that the passage of an ordinary bougie will often fail to show the presence of a commencing stricture, as the normal size of the meatus precludes the use of a bougie of sufficient size to detect this stricture.

It is very important, therefore, that every case of gonorrhoea which has shown signs of local infection of the lacunæ of Morgagni or of the glands of Littre, or which has been resistant to treatment, should be most carefully examined for the presence of incipient stricture before being sent away as cured. Routine urethroscopic inspection of all such cases shows that in a very definite percentage either there are still one or more patches of infected follicles, or that a section of the canal is the seat of a soft infiltration of the mucosa. The application of caustic or the diathermic point to the follicles will cure the first source of trouble, whilst the second can be removed by a gentle stretching of the infiltration with a Kollmann's dilator.

The extremely mild cases of gonorrhoea should always be viewed with suspicion. The very ease with which the disease yields to treatment and the lack of symptoms should cause one to be all the more careful before dismissing the patient as cured. The reason for this is that, whilst a large percentage of these cases are indeed trivial, and of no special importance, yet there are a certain number of them which offer a very stubborn resistance to complete recovery. All apparent symptoms and signs may disappear readily, and it is only by repeated microscopic examinations that the persistence of a minimal amount of trouble can be detected. Such cases are exceedingly liable to form the basis of a future stricture, and no such case should ever be dismissed from observation before thorough examination has been made to exclude small foci of infection or the genesis of a soft infiltration. If this is always done a large number of strictures will be discovered after their birth when they can be readily dealt with.

Routine Treatment of Stricture.—This consists of intermittent dilatations with the Kollmann's dilator at intervals of about 7 days. It is based on the theory of Mr. Canny Ryall, that, as every healthy urethra can be dilated to a 45 Charrière under a local anæsthetic, the cure of stricture consists in restoring the urethra to its original state of dilatability by means of systematic periodic stretchings. It is an obvious improvement on allowing the stenosis to remain at the calibre of the external meatus. No other treatment will give the same certainty of cure in such a large percentage of cases. If properly carried out it is practically painless and does not take the patient away from his employment, except for the actual time of treatment, which is usually required only once a week. The technique must be carried out exactly and requires some patience and application on the part of the surgeon to acquire the necessary degree of experience. There are, however, no insuperable difficulties which need deter any one from adopting this method.

It will have been discovered at a preliminary investigation whether the constriction will admit a close Kollmann's dilator (23 Charrière). If not, bougies must be used until the requisite calibre is reached. Practically all strictures are, in part at least, situated in the anterior urethra, so that dilatation is always commenced with the straight pattern dilator. It is bad technique to stretch any stricture with the curved instrument until the constriction in the anterior canal has been fully expanded because the curved dilator is a much more severe appliance and, unless the anterior urethra has been stretched fully to allow efficient drainage, the minute traumatism which are inseparable from any form of instrumentation

of the posterior urethra, may cause more or less severe attacks of catheter fever after each dilatation. By stretching the anterior urethra first the main portion of the stricture can be dealt with and the use of the curved instrument is restricted to a minimum. Occasionally a stricture is situated so far back that it cannot be reached with the straight instrument, which necessitates the use of the curved Kollmann from the commencement of treatment. Such cases are, however, relatively uncommon.

The actual stretching is carried out under efficient local anæsthesia, the dilator being opened step by step as the urethra gradually relaxes under the pressure of the dilating blades. This is continued until there is no further yielding after waiting a few moments following the previous advance. When this point is reached the appliance is carefully closed and removed.

This process, which lasts about a half to one hour, is repeated week by week, and it will be found that, if the technique is correct, there will be a steady weekly advance in the size to which the urethra can be dilated. When the limit of the instrument, 45 Charrière, is reached the case should not be regarded as cured but dilatations should be made to 45 on one, two, or more successive weekly occasions, until it is possible to reach the maximum expansion easily. At this stage it is also necessary to carry out one or more dilatations with the curved Kollmann's dilator to make certain that no part of the stricture has been left untreated.

The greatest care must be taken not to expand the appliance either too far or too fast, and an advance of one or two points over that reached on a previous occasion is all that is permitted.

The actual stretching should occupy about 20 minutes in a straightforward case, whilst in one of difficulty the dilatation should be spread over as much as 40 to 45 minutes. If pain occurs during treatment or there is severe bleeding when the instrument is removed from the urethra, it indicates a faulty technique, and greater vigilance must be exercised on future occasions both as to the rate of advance and as to the force needed to work the instrument. The more skilled an operator becomes the fewer will be his cases of bleeding; and the appearance of even a few drops of blood after a urethral dilatation should be regarded as a warning to go cautiously. The exact amount or the speed at which a case can be stretched at an individual sitting depends on the particular subject, and it is impossible to indicate more than the general lines upon which one should proceed in an ordinary case.

Reviews.

MEDICAL REPORT OF THE HAMILTON RICE SEVENTH EXPEDITION TO THE AMAZON IN CONJUNCTION WITH THE DEPARTMENT OF TROPICAL MEDICINE OF HARVARD UNIVERSITY, 1924-1925. (Contributions from the Harvard Institute for Tropical Biology and Medicine. No. IV. 1926.) Cambridge: Harvard University Press, 1926. Pp. xvi plus 313, with 70 illustrations and 16 figs.

THIS is a wonderful book. It is one to make the medical research worker's mouth water: whilst it will be of profound interest to protozoologists, entomologists, and parasitologists throughout the world. One has seen lately in the newspapers complaints that the great days of adventure and exploration are over, that there are no new worlds to conquer; this is emphatically not true of the sphere of tropical medicine; every tropical country presents its unsolved problems, whilst nowhere is there such a wealth of unexplored material as in tropical South America. The Congo, in comparison with the Amazon, is well mapped territory.

DEC., 1926.]

The staff of the expedition consisted of Dr. Richard P. Strong, whose name is so well known in the annals of research work in tropical medicine, Dr. George C. Shattuck, Dr. Joseph C. Bequaert and Dr. Ralph E. Wheeler. The expedition was both well founded and well found; its equipment included a river steamer, a steam launch, and a hydroplane. The route traversed was up the Amazon to the headquarters of the Branco and Orinoco rivers, lying chiefly through a large forest-covered plain constituting the greater portion of the most tropical parts of Brazil, and including the cities of Pará and Manaus, where many of the special investigation into diseases were carried out. "The climate," write the authors, "is characterised particularly by great heat and moisture and there are an extraordinarily large number of biting insects, some of which frequently transmit disease. The great humidity and continuous high temperature throughout the year render the climate especially debilitating and enervating to those who reside in it, and the population at different times in large areas of territory and particularly in some of the villages, has been almost exterminated by disease." And of the vast Amazon forest, they give a most forceful and graphic description; "the virgin forest of the Amazon offers little hospitality to the traveller, and it has perhaps been appropriately named by Alberto Rangel the *inferno verde*, where one soon dies of hunger, and during the dry season suffers from thirst, when almost all the streams which traverse it are reduced to some few puddles of stagnant or brackish water. It is too thickly and too regularly grown to be grand or picturesque, and too silent to be cheerful. It breeds too much vermin to be agreeable, and produces at length upon the traveller vague sensations of sadness, oppression and uneasiness, which cause him to breathe a sigh of relief or to cry out with joy when chance conducts him to some *campinarana*, or small prairie, or when he reaches the sunny banks of a stream with billows tumbling among the rocks of its yet imperfectly excavated bed." Outside the towns the population is entirely primitive; disease of every type is absolutely rampant; and the medical and public health problems of Amazonia so vast that they almost defy definition. The prevailing diseases are malaria, tropical splenomegaly, chronic ulcerative processes of the skin, leprosy, and syphilis. Hookworm disease is also very common, and beriberi, dysentery, typhoid, and small-pox are not infrequently seen. Special studies were conducted with respect to the cause and nature of the chronic inflammatory and ulcerative processes of the skin—(indeed in this respect the volume includes one of the most important contributions to the study of tropical skin diseases ever published), to tropical splenomegaly, and to the biting insects which prevailed. Animals—and especially the wild mammals of the dense forests—were examined for parasitic infections, and especially with a view to their possibly constituting reservoirs of human infections; a very large collection of local insects was made; and a very large amount of pathological material for study was obtained. In brief, the expedition has made an outstanding contribution to the furtherance of the study of tropical diseases in their every aspect.

After an introductory chapter dealing with the constitution of the expedition and its aims, comes a graphic chapter on the conditions in the Amazon forest, illustrated by magnificent photographs taken from the hydroplane. The vast vistas of partially submerged forest convey a vivid impression of the terrible characters of the country traversed, and of the difficulties in the way of opening it up to civilisation.

Chapter 3 deals with the spirochætal infections encountered. Syphilis is very prevalent; the population of Manaus is estimated at about 50,000, yet no less than 24,661 patients with venereal diseases presented themselves for treatment during two years at the hospitals in the locality. Yaws is much less prevalent and yellow fever has been practically stamped out or has died out from natural causes. Weil's disease is of occasional occurrence; relapsing fever is very rare indeed; a few cases of rat-bite fever have been reported, whilst recently

Micheloni (1925) has described a new spirochætal infection due to *Spirochaeta riverensis*, associated with symptoms of chronic meningitis, tinnitus and cardiac palpitation; the Wassermann reaction is usually positive, but salvarsan does not affect the condition, which usually ends fatally in adults.

One of the finest sections of the report is chapter 4, which deals with chronic inflammatory and ulcerative processes of the skin. Ulcus tropicum was by far the commonest type of ulceration encountered. Vincent's spirochæte and the fusiform bacillus were identified in numerous cases. A detailed discussion is given of the possibility that the free-living spirochætes of dirty water may become pathogenic to man by acquiring increased virulence, and that spirochætes of the intestinal tract may also become pathogenic. (Everywhere throughout the whole volume full references are given to the work of other authors, and bibliographies added.) Unlike former workers, the authors were successful in transmitting infection with the virus of ulcus tropicum to experimental animals; typical sloughing phagedenic lesions were produced by subcutaneous inoculations in monkeys, and necrosis in the testis of a rabbit. The spirochætes from stagnant water however failed to produce lesions when inoculated into animals. The authors conclude that Vincent's infection is probably never a primary one, but that it occurs on surfaces already traumatised or ulcerated from other infections. By way of treatment they found that salvarsan and arsphenamine, given both locally and by injections, were very satisfactory.

A new form of dermal granulomatous infection due to spirochætes was discovered, in addition to Vincent's infection. The condition appears to affect especially the dorsum of the foot and ankle, and consists of papillomatous-like or condylomatous growths in which the individual protuberances are closely packed and form large confluent patches of granulomatous tissue, which later ulcerate and shew a tendency to heal by the production of scar tissue at the base of the lesions; thus the superficial appearance is not unlike that of an epithelioma. The papillomatous masses are often fissured, are tender and may give a boggy sensation on pressure. Film examinations shew enormous numbers of spirochætes, but no fusiform bacilli. The spirochæte is morphologically entirely different from *S. pallida*, *S. pertenuis*, and *S. vincenti*; it measures some 14 μ to 30 μ in length, is longer and much thicker than the spirochætes of syphilis and yaws, whilst the ends frequently give the appearance of a terminal deeply stained end or granule. Cultures were taken in which the spirochætes survived for five days, but were then killed out by bacterial contamination. No local lesions could be produced in monkeys with the virus, but on injection into the testis of a rabbit an acute inflammatory area developed, in which a few coarse spirochætes were found. A full histological description of this new form of dermal granulomatous spirochætosis is given, and the authors propose the name *Spirochaeta noguchii* for the new spirochæte.

"Mossy foot" is a different condition from the above, the leg being affected with a pseudo-elephantiasis plus the ulcerated granulomatous "mossy" condition of the foot. A typical case which was examined shewed no microfilariae in the night blood; oval yeast-like parasites were encountered in films from the lesion but failed to grow in cultures. A full account of the histology of the condition is given with a coloured plate. The authors consider that typical "mossy foot" is probably of blastomycotic origin, but that probably *S. American leishmaniasis* and other conditions have been confused with it, and that the name covers a number of lesions due to various ætiological agencies.

Granuloma inguinale is another muco-cutaneous lesion not uncommon in Amazonia. There is much discussion as to the ætiological agent of this condition. Walker (1918) isolated the *Bacillus mucosus capsulatus* from the lesions; and Noguchi (1912) incriminated a spirochæte, *S. phagedenis*. The members of the expedition however were not able to isolate the former, or—

apparently—to find the latter. It seems much more likely that the intracellular yeast-like forms first described (in India) by Donovan (1905)—in this journal—may have some connection with the disease. Further and careful investigation of the subject is called for.

Dermal leishmaniasis is not common in Amazonia. A rather striking photograph of a papulo-pustular and extensive lesion due to leishmania is given. The question of the true diagnosis in cases of rhinopharyngitis mutilans is discussed; some of these cases may originate perhaps as leishmania infections, but essentially leishmania parasites do not tend to cause destruction of tissue: they tend to cause endothelial proliferation. Many if not most of such cases where the palate and nares are destroyed are due to secondary infections, such as leprosy and syphilis. A large number of dogs was examined at Manáos, but no leishmania infections encountered. Phlebotomy are very rare in Amazonia, a finding which would account for the rarity of leishmania infections.

Leprosy is not uncommon in Amazonia; by the end of 1923 there had been 460 cases registered at Manáos; this only includes cases in the city and its immediate vicinity, and it is probable that some 1,000 cases exist in the State of Amazonia. The disease is stated to be on the increase in the State, and undiagnosed cases were found in the wards of a general hospital at Manáos. A leper home for some 50 to 80 patients exists, but conditions are poor. The authors comment on the fact that, whilst marked improvement often occurs on using the ethyl esters of chaulmoogra and similar oils, yet this line of treatment cannot in any way be said to be a specific cure for leprosy. Intravenous injections of mercurochrome-220 have been followed by marked and rapid improvement, but reactions following injection are apt to be severe. Mercuraphen and metaphen are on trial.

Malaria is the most prevalent and most serious disease of Amazonia. The climate is eminently suitable for severe endemic malaria, and Chagas (1921) has described local malaria of very severe type in Amazonia, associated with increasing oedema and with marked and progressive cardiac insufficiency. Twenty-eight per cent. of the mortality at Manáos is due to malaria. On the other hand the members of the expedition conclude that, although malaria is admittedly of severe type in Amazonia, it may be of just as severe a type in other places in the tropics. What is very common in Amazonia, however, is a type of splenomegaly, occurring especially in children and young adults, the true aetiology of which is very obscure. Towards the solution of this subject this very important and informative chapter is a notable contribution. The whole subject is discussed, together with the previous literature on it. The splenomegaly due to malaria, kala-azar, and undulant fever can usually be ascribed to the true aetiological agent with some degree of certainty. Tuberculous and syphilitic splenomegaly can usually be identified, if a sufficiently thorough examination of the patient be made and the appropriate tests applied. Banti's disease or splenic anaemia may present an obscure diagnosis at first, but the progress of the disease, with the onset of scanty urine loaded with urobilinogen, and of hepatic cirrhosis and ascites is characteristic, although the true aetiological agent is not known. Gaucher's disease presents but little in common with the other forms of splenic anaemia, and the familial history is characteristic. Egyptian splenomegaly is probably of bilharzial origin. Over and above these groups, however, there remains a residue of cases of "tropical splenomegaly," and this matter the authors proceed to discuss. It is very common in Amazonia. It frequently starts in infants of three to four years of age, and in some districts more than half the children appear to be affected. The enlargement of the spleen is progressive and painless, and the spleen may in time almost come to fill the abdomen. Later, hepatic cirrhosis and ascites set in. The disease is characterised by irregular fever, and although there may be leucocytosis in the early stages of the disease,

later there is progressive leucopenia and progressive anaemia of chlorotic type.

Histologically, the spleen shews a hyperplasia of the lymphatic elements and a definite increase of its fibrous tissue. The Malpighian follicles are sometimes greatly reduced in number or their outlines are indefinite. The liver shews monolobular and polylobular cirrhosis. In the cases studied by the expedition spleen puncture was frequently resorted to. In some instances malarial parasites or pigment were found, but in many instances there was no evidence of malaria at all. Cultures of spleen juice on Noguchi's leptospira medium had negative results, and kala-azar can be excluded. The dubious parasite *Toxoplasma pyrogenes* described by Castellani from such cases is discussed. Also the question of cryptococcal infections.

The whole of the discussion on this matter in chapter 8 of the book will be of great interest to workers in the tropics. (There is no question as to the existence of these cases. It would appear as if the spleen may enlarge as the result of metabolic changes as well as from parasitic infections.) The cases are such as almost defy all forms of treatment. The reviewer has at the present moment two such cases under treatment. In one, a child of six, a hæmolytic streptococcus was isolated from the stool, and the child is doing very well on an autogenous vaccine. In the second, a male adult, a hæmolytic streptococcus was also isolated from the stool, and at first the patient appeared to do well on an autogenous vaccine. Then he began to go downhill. Soamin injections improved his condition for a time, but were again followed by failure, and he is at present on "Hæmostyl." Repeated spleen punctures, thick blood films, all routine blood and serological tests have given negative results in both cases; there is no helminthic infection in either case on repeated examination of the stools. It would appear that some of these cases are due to invasion of the blood stream by a hæmolytic streptococcus from some focal lesion, others perhaps to metabolic disturbances. But the whole subject is of such importance that sound team-work is needed in its investigation. It is of interest to note that the condition in India, as far as one knows, is never seen in Europeans, whether adults or children.)

Chapter 9 deals with trypanosomiasis, and a most interesting account is given of the history of *mal de Caderas* in Amazonia. This disease is one of tremendous veterinary importance in Brazil. An account of its clinical features, methods of diagnosis, its possible transmission by tabanid flies, and of the capibara—a rodent somewhat resembling a pig—as a possible reservoir of the disease is given. A detailed account of Chagas' disease (S. American trypanosomiasis) is given, although the expedition did not encounter any case of this disease in the Amazon valley. The tatu—a species of armadillo—is under suspicion as a possible animal reservoir of the infection. The tatu, and also two species of *Triatoma* and two of *Rhodnius* are prevalent in the Amazon valley, but the human disease appears to be absent. A most interesting account is given of trypanosomiasis in the smaller ant-eater, *Tamandua tetradactyla*; the trypanosome appears to be identical with *Trypanosoma legeri*, described by Laveran and Mesnil (1912) from a different species of ant-eater, *Tamandua tridactyla*.

Chapter 10 deals with blastomycotic infections, with special reference to lymphangitis epizootica of horses, due to *Cryptococcus farciminosus*: a full account is given, and the question of *Cryptococcus* infections in man discussed. Chapter 10 deals with other parasitic infections in animals. Filariasis was encountered in the three-toed sloth, and also in the coati, *Nasua socialis*. In the latter animal there also occurred a new cestode, *Atriotenia parva*, a detailed account of which is given in chapter 12 by J. H. Sandground. The filarial infection in this animal appears to have been non-pathogenic, but the cestode infection had invaded the pancreas—a very rare finding in cestode infections, whilst intestinal bacteria had invaded the pancreas together with the mechanical migration of the worm and had caused a

fatal peritonitis. Several other parasitic infections of animals in Amazonia are described, with a series of very fine coloured and half-tone illustrations; thus a *Bolantidium* infection was found in a cutiaya—an animal somewhat resembling a rabbit; and infection with linguatid worms in a *Callicebus* monkey. Hookworm infection was found by the authors to be very common in dogs and cats in Amazonia, as also in man. *A. canium* is present in almost 100 per cent. of the local dogs, and *A. braziliense* in some 74 per cent. Hookworm ova were found in the feces of a urubu vulture, but no hookworm parasites in the intestinal tract of these birds. Hemogregarine infections were very common in snakes in the district, and a discussion of the—supposed—hemogregarines of man recorded in the literature is given. Herpetomonad parasites were also encountered in local *Euphorbia* plants, but human leishmaniasis is not common in the area.

An interesting account of pathological conditions produced by Arthropoda is given and will delight the heart of entomologists.

Stinging ants are very common but are chiefly found away from habitations; the symptoms are usually only localised, but urticaria and even fainting fits have been recorded as sequelæ. Simuliidæ constitute a perfect pest in the Amazon valley. In some sensitive skins actual vesiculation may follow the bite, in others urticarial wheals. Ciurea and Dinulescu (1924) have recorded swarms of these flies as having caused serious mortality among animals in Jugoslavia; in 1923 some 16,000 animals—horses, asses, oxen, buffaloes, sheep, goats and pigs—were officially stated to have been killed in the course of a few days with enormous suffering due to the extensive bites of *Simulium columbaczense*. The toxin of the fly appears to act principally upon the heart and on the central nervous system. *Simulium damnosum* is well known as a terrible pest in equatorial Africa. The lesions produced by the bite of tabanid flies vary in intensity; they are usually discrete and papular, and a good photograph of the condition due to multiple bites is given. If the bites occur about the ankles, there may be considerable local œdema. Trombididæ (mites) are very prevalent in the Amazon basin, but so far no association with any typhus-like disease in man has been traced. The "chigger flea," *Dermatophilus penetrans*, is also encountered in Amazonia, and tetanus has been reported to have followed on its burrowing into the skin. Scorpions are prevalent and the bite may be followed by severe symptoms.

Part II of the volume contains a full account, illustrated by photographs and sketches, by Dr. J. Bequaert of the expedition, of the medical and economic entomology of the Amazon valley. Full lists are given of the Arachnoidea and Insecta encountered. Very special stress is laid on the importance of the Tabanidæ in producing diseases among the horses and animals of S. America. In Part III Dr. Shattuck gives a general account of observations on the Branco, the Uraricuera and the Parana rivers. The Indian tribes here appear to suffer less from contact with civilisation than do their compatriots further down the valley; the climate is colder, and the physique of several of the tribes very good.

We trust that we have attempted to give our readers a glimpse of the contents of this fascinating volume. It is a splendid contribution to tropical medicine, and worthy of the Harvard Institute and of the well known authors who contribute to it. The book is admirably published, and replete with coloured plates and half-tone illustrations. The photographs constitute a veritable picture gallery for a museum in tropical medicine. The appeal which this admirable and interesting book will make should be to a very wide circle of readers; it will appeal to the teacher of tropical medicine, to the laboratory and research worker, to the protozoologist, mycologist, and entomologist. It contains many contributions to veterinary medicine. Finally it is inspired on every page with the splendid spirit of adventure, investigation and research which to-day characterises the American (and British) Schools of Tropical Medicine.

The authors, the publishers, and Dr. and Mrs. Hamilton Rice who have done so much towards the scientific exploration of South America, are to be most warmly congratulated on its publication.

R. K.

ABDOMINAL OPERATIONS.—By Sir Berkeley Moynihan. Two volumes, totalling 1,217 pages, with 470 illustrations. Fourth edition, revised. Philadelphia & London: W. B. Saunders Company, Ltd., 1926. Price, 90s. net per set.

THIS book was first published in 1905 and reached its third edition by 1914. When it first appeared, its distinguished author was already famous for his work in the Leeds School and had published in conjunction with Mayo Robson two works on the surgery of the gall-bladder and the stomach which broke much ground which was then new. The first edition, as the author says in his preface to the present edition, won for itself and him many friendships. It did so because at a time when only a few of the more enterprising surgeons attempted such operations as cholecystectomy and gastrectomy, when opinions were much divided as to the value of these procedures and when the text books still gave rather vague advice which was very confusing for the young surgeon, this book shed a flood of light on ways which were dark. To the surgeon working in this country, who had not had the opportunity for some years of seeing operators at home and could only gather what was going on from papers in the journals, it was a priceless boon to have a book which gave a clear, well-illustrated account of how to do these upper abdominal operations, which then seemed so difficult. "Moynihan never muddles you," as a colleague of the reviewer remarked some twelve years ago in the course of a discussion about impacted gall-stones. That was the secret of its success, and as later editions appeared the popularity of the book never waned. It is twelve years since the last edition and the author is now the greatest authority in the world on the surgery of the upper abdomen. In the meantime surgical opinion has crystallised and all the world now does much the same operation for similar conditions, but a great deal of the credit for this stabilisation is due to Moynihan's work. With increasing experience he has perfected his technique in the minutest details and he gives us the benefit of this in the present edition. The chapter on surgical technique is new and deals with the author's technique in detail. "Was it not Michael Angelo who said that success depends upon detail but success is no detail?" "In respect of surgical work there may be some truth in Blake's assertion that all excellence is in minute particulars." These quotations indicate the keynote of the chapter and it will well repay study. Moynihan has always possessed a pleasing literary style and it shows to advantage in this book, nowhere better than in the preface, where in a few words he sketches the ideals of the surgeon and the supreme importance of technique:—"We speak, it may be with pride, of a mortality of only one per cent. But if you are the one in someone's hundred."

A book which has passed through so many editions hardly calls for any criticism of its subject-matter. It is at its best where the author gives us the benefit of his vast experience, as in discussing the causation of jejunal ulcer and failures after gastro-enterostomy, mostly due to selection of the wrong cases, incomplete operations which do not deal with the ulcer itself, or bad technique. So too with the complications of gastro-enterostomy, such as hæmorrhage and regurgitant vomiting, they were due to faults of technique and have receded into the background nowadays, so much so that after five pages of discussion of the causes of the latter condition, the author sums up the modern view in one paragraph and tells us that he has not seen it in his last few hundred cases, nor we think will it ever be seen by any operator who uses the Mayo no-loop method. The causation of jejunal and gastro-jejunal ulcer is still far from certain, the author's view that it is probably due to the persistence of those causes which

first led to the development of the original ulcer, a focus of sepsis elsewhere and a high degree of acidity has much to commend it and points the way to its prevention. The treatment recommended is by gastrectomy in the majority of cases, a view in which most authorities concur. The chapters on gastrectomy are illustrated by some beautiful plates of the lymphatics of the stomach, and the account of the author's method of performing the operation is one of the clearest we have ever read.

The sections on intestinal surgery follow the usual lines, a whole chapter is devoted to jejunostomy, a procedure whose value is coming to be increasingly recognised. The long drawn out controversy on the removal of the appendix at the time of opening an abscess seems to be settled at last by a general agreement that it should only be done if no extensive search is required.

The article on liver abscess is quite up to date, there is a full description of the treatment by aspiration and emetine, and Calcutta workers' contributions to this subject receive due recognition, a most unusual feature in a text-book of operative surgery.

Needless to say the sections on the gall-bladder and bile ducts are amongst the best in the book; cholecystectomy is now the operation of election but there are cases for which, though it may be the ideal procedure, it is not necessarily the wisest, and these cases are classified in a few clearly written paragraphs. Reconstructive operations upon the bile ducts are described in great detail and a whole chapter is devoted to the difficult subject of secondary operations. Cirrhosis of the liver is dealt with in a somewhat disappointing manner, the latest American work finding no place. The last chapters give a very complete account of the surgery of the pancreas and spleen and bring a monumental work to a fitting close.

The only criticism which we have to make is that the pages are cumbered up with many old tables of case results, which have little interest nowadays. For instance there is a table of results of 44 cases of wounds of the intestine, of which the latest was in 1912. This table occupies seven pages, and however interesting it might have been in the earlier editions, the space might now be more suitably filled with modern statistics, such as those to be found in the *Medical History of the Great War*.

In conclusion we would say that this is a book which should be in the possession not only of all surgeons, but especially of those called on to do abdominal surgery occasionally. The paper and printing are of the highest quality and mention must be made of the excellence of the illustrations.

W. L. H.

- **THORACIC SURGERY. THE SURGICAL TREATMENT OF THORACIC DISEASE.**—By Howard Lillenthal, M.D., F.A.C.S. In two volumes, totalling 1,294 pages with 904 illustrations, 13 in colour. Philadelphia & London: W. B. Saunders Company, Ltd., 1925. Price, 90s. net per set.

THIS monumental work on thoracic surgery by one of the foremost authorities in the world will rank as the finest text-book on this subject for many years to come. The author possesses a charming facility of expression which is only surpassed by his innate modesty.

The first chapter deals with general considerations pertinent not only to this branch but to other branches of surgery as well. The author states that the pleura is unaffected by contact with unfiltered air but that if it is exposed at operation for more than thirty minutes it pours out a serous effusion in the immediate post-operative period. In aspirating the pleural cavity for diagnostic purposes the lung must not be punctured through a closed thorax; therefore, if abscess of the lung be suspected, one should never aspirate except on the operating table preparatory to thoracotomy, as the author has seen fatal gangrenous phlegmon of the chest wall result on several occasions from infection of the tissue planes on withdrawing the infected aspirating needle.

The pus from lung abscesses has a fœtid smell and if one should withdraw pus on aspiration which possesses an odour, remove the syringe, wash it out with alcohol, then reconnect with the needle and inject a few drops of alcohol to sterilize the bore of the needle before withdrawal. This limits the chance of phlegmon of the chest wall occurring.

For the prevention of shock it is stated that digitalization for one or two days before operation has proved its value. Using tincture of digitalis one allows one minim per pound of body weight and starts with an initial dose of forty minims say at 8 a.m., then ten minims doses every two hours till one hundred and fifty minims have been taken—the effect of digitalis thus administered is said to last for 21 to 23 days. Another drug recommended for the prevention of shock is epinephrin, 1:1000 mixture of the drug in sterile olive oil, of which 1 c.c. is injected intramuscularly immediately before and after operation and repeated every two to four hours until the probability of the development of shock has passed. To promote the coagulability of the blood the author regularly in resections of a lobe of the lung injects deeply into the gluteal muscles with an ordinary 20 c.c. syringe 30 to 40 c.c. (15 to 20 c.c. into each buttock) of a 30 per cent. sterile water solution of sodium citrate in the early stages of anaesthesia, the change in clotting time occurs in 20 minutes and persists for 24 hours. As the injection of the citrate solution is painful, in a conscious patient it is better to give a preliminary injection of 5 c.c. of a 2 per cent. novocain solution in the proposed injection sites. When faced by a low blood pressure of say 80 or 90 mm. pre-operative blood transfusion if a suitable donor is available, or failing this epinephrin injections are advised. For post-operative shock blood transfusion is the most important single restorative. Following apparent chloroform death Bauman resuscitated two children by injecting $\frac{1}{2}$ c.c. of 1 in 1000 epinephrin solution into the muscles of the left ventricle of the heart. He recommends $\frac{1}{2}$ c.c. for children and $1\frac{1}{2}$ c.c. for adults and injects in the 4th interspace $5\frac{1}{2}$ cm. from the left margin of the sternum. An interesting chapter on the use of drainage tubes and posture for the drainage of empyema follows. The chapter on roentgenology is particularly illuminating, being illustrated by excellent reproductions of skiagrams. The chapter on anaesthesia by Branower gives a good description of the technique of intra-tracheal anaesthesia. A very simple technique for blood transfusion by the sodium citrate method is described in chapter VI by Ottenberg. There are excellent chapters on the heart and oesophagus. Of more particular interest to the general surgeon are the chapters on acute and chronic empyema. The old myth that as soon as pus is found in the pleural cavity operation should immediately follow is dispelled, and it is pointed out that repeated aspiration permits of fixation of the mediastinum and renders the inevitable operation, i.e. thoracotomy safer of performance. In chronic empyema the author's method of thoracotomy combined with removal of the thick exudate from the visceral pleura permits the lung to expand and obviates the performance of those crippling and deforming operations of Estlander, etc. Irrigation of the pleural cavity by the Carrel-Dakin method is a powerful adjunct in the treatment of empyemata which is largely used. Dr. Lillenthal submits a table of 34 resections of a portion of the lung mostly for bronchiectasis with a mortality of 21. The desperate condition of these patients renders any operation justifiable and his results are very remarkable considering that of the 13 who recovered from the operation the majority were cured. The photographs of the patients after operation shew a surprisingly small amount of deformity.

Chapter XXVIII treats of tuberculosis of the lungs and its treatment by induced pneumothorax. Great surgery, pioneer surgery, but alas outside the scope of the general surgeon. Surgery of this magnitude demands specialisation and most important of all uninterrupted team work. Be that as it may, we are convinced that

the time will come when thoracic surgery will be almost as common in performance as abdominal surgery, and Dr. Lillenthal will be rightly acclaimed as one of the great pioneers in this achievement. The volumes are excellently printed and illustrated and should be purchased by all surgeons.

W. L. H.

MEDICINE MONOGRAPHS. VOL. VII. LEAD POISONING.—By J. C. Aub, L. T. Fairhall, A. S. Minot and Paul Reznikoff. London: Baillière, Tindall & Cox, 1926. Pp. 265, with 35 figs. Price, 18s. net.

THE authors' chapter on the detection and estimation of lead in organic material is especially well written. We are at one with the authors in choosing the chromate method as the most reliable method for the quantitative estimation of lead, but the arrangement for preserving the standard thiosulphate solution as described by them is not very easy to carry out. The thiosulphate solution, if mixed with a little potassium bicarbonate, can be stored in a bottle in the ordinary way and keeps for a fairly long time. This can be most conveniently standardised against standard potassium dichromate solution. This would obviate the use of the double standardisation method of iodine and arsenious acid solution as described by the authors. The method of microchemical detection of lead mentioned is highly technical and scientific and suitable only for skilled hands. We expected something about "lead in water and tinned foods" in addition to "lead in liquor," as given in the addendum.

The chapters on the pathology and physiology of lead poisoning are almost the last word on the subject, and the chapter on the prevalence of industrial lead poisoning in the United States by Dr. Alice Hamilton practically supplies all useful information to those who are interested in the subject.

R. B. K.

TEXT-BOOK OF PUBLIC HEALTH.—By E. W. Hope, O.B.E., M.D., D.Sc., and C. O. Stallybrass, M.D., D.P.H. Ninth edition. Edinburgh: E. & S. Livingstone, 1926. Pp. 340, with 71 illustrations. Price, 15s. Obtainable from Butterworth & Co. (India), Ltd., Post Box 251, Calcutta. Price, Rs. 11-4.

THE eighth edition of Dr. Hope's well known text-book of public health was published in 1919, and the present edition—the ninth—has been brought out in collaboration with Dr. Stallybrass. It covers 336 pages as against 267 of the last edition and contains new chapters on general epidemiology, the welfare of motherhood and infancy, and occupational hygiene. The work is primarily intended to serve as a text-book for students studying for one of the qualifying examinations, and also for those post-graduates who are preparing for the Diploma in Public Health. The book will serve both these purposes if read in conjunction with some of the well known works which we have in India. About 46 pages have been devoted to the description of sanitary laws. It is doubtful whether in a book of this nature it is desirable to devote so many pages to this subject. But opinions are divided on the subjects. In India sanitation is still in its infancy, and this book, written by such well-known men will certainly be a valuable guide to persons engaged in public health work. The chapters on climate, lighting, air, ventilating, etc., are well written and contain all the latest information. The chapter on food has been mostly re-written, and the articles on food poisoning and preservation of food are particularly good and useful. Some subjects have been very scantily described. For

instance, very little has been said regarding slow sand filters and mechanical filters. It is equally disappointing to find no mention regarding the 'taste' of chlorinated waters, a subject on which much work has been done by Houston and Adams. The chapters on general epidemiology and infective diseases are very good and useful, but for use in India the preventive measures relating to such important tropical diseases as malaria, plague, cholera, etc., require fuller details if they are to serve a useful purpose to men working in India and the East. Insects play such an important part in the spread of different diseases that one feels disappointed to see such a short description of them.

Public health workers and students will find in this book a most useful companion.

THE BIOLOGY OF THE PROTOZOA.—By G. N. Calkins, Ph.D., Professor of Protozoology, Columbia University. London: Baillière, Tindall & Cox, 1926. Pp. ix plus 623, with 238 illustrations. Price, 35s. net.

"This is a profoundly interesting book and one of great importance to protozoologists, biologists generally, and zoologists. In many ways it replaces the author's two former well known works, Calkins' "Protozoa," and his "Protozoology"; in others it takes the place of two older well known books, Minchin's "Introduction to the Study of the Protozoa," and Jennings' "Behaviour of the Lower Organisms." The present volume is the outcome of a lifetime of research work and study; "In the present work," writes Professor Calkins, "I have brought together the conclusions founded on thirty years of research on the Protozoa and on an equal number of years of teaching protozoology at Columbia University and recently at the Marine Biological Laboratory at Woods Hole." Professor Calkins has made many and notable contributions to our knowledge of the biology and bionomics of the Protozoa, and there is no one more competent than he to set forth the problems and difficulties involved in the study of this fascinating subject.

"There is no doubt that our knowledge of the structure of the Protozoa far outstrips our knowledge of their functions." This quotation gives the key-note of the book. The volume of output of papers dealing with the morphology of the Protozoa is enormous and is ever increasing; but the biology of the Protozoa is a far more difficult, yet an equally important subject, and to it this splendid book constitutes a notable contribution. Essentially, Professor Calkins sharply differentiates between life and vitality; life is the structural organisation of the individual, vitality the exercise of its functions by the individual. The connection between the two is well understood for the higher types of the Metazoa,—we know the reasons for the existence of most of the structures in the human body, for example,—but in the tiny Protozoa the connections are far more obscure. Yet they are of fundamental interest, since the entire superimposed tree of the Metazoa must have originated from ancestors resembling the Protozoa.

Chapters 1 and 2 are introductory chapters, dealing with the general organisation and structure of the Protozoa. Differences in morphological structure among the Protozoa are quite as wide as among the Metazoa; a paramœcium, for instance, differs as widely from a free-living amoeba as does man from a nematode worm; yet here we have an excellent general presentation of the subject, covering a very extensive tract of territory in brief and lucid style. Certain terms are rejected; thus "karyosome" at the hands of different authors may mean any one of three or four different structures; in its place we have used "endosome"—after Minchin—for the masses of chromatin within the nuclear membrane, and "endobasal body" for the nuclear elements related to the motor activities of the cell. The "binuclearity hypothesis" is briefly but

clearly discussed, and rightly rejected; its blind acceptance by protozoologists on entirely insufficient evidence has been a stumbling block in the way of advancement of the science for some twenty years. Axostyles, we note that the author regards as motor organs, chiefly on the work of Kofoid and Swezy. We are not at all certain that the claims for this view can be regarded as proved. The two chapters however form an admirable introduction to the study of protozoology generally and will be very helpful to teachers of the subject.

The author then proceeds to discuss structural differentiation of the different elements within the body of a protozoon, and this chapter again presents an excellent analysis of a very wide subject. It is amusing to think that the contractile vacuoles of many free-living protozoa were once regarded as being hearts; they are clearly excretory in function, but recent work has shewn that they may also play an important part in regulating the osmotic tension of the protozoon cell body. Tropism amongst the Protozoa is admirably dealt with; so marvellous are many of the adaptations to their environment of the higher Protozoa that one must almost credit them with memory and with powers to learn, yet the basis of all such reactions to stimuli is probably physical and chemical, and not due to memory or a power to learn. Yet there are instances of selective feeding, for example, that are quite as wonderful as that of the honey bee. Thus *Actinobolus radians* possesses a coating of cilia and protractile tentacles and hangs with its mouth downwards in the water and its tentacles expanded below it. Amid these tentacles free-living flagellate and ciliate protozoa swim undisturbed. But the instant that a *Halteria grandinella* comes amongst the tentacles, this one particular species of prey is immediately harpooned by the tentacles and remorselessly swallowed at a single gulp. What are we to make of such an instance of selective feeding? It not unnaturally follows that both *Halteria grandinella* and *Actinobolus radians* are rare protozoa. Yet the author maintained a strain of the latter through 375 generations by giving it a daily ration of 2 to 3 dozen *Halteria*. It is as if a man were to live solely upon oysters of one species!

Three most interesting pages (pp. 190-192), deal with the methods in which protozoal parasites may cause symptoms of disease. We could wish that this subject had been more fully dealt with; in fact an extra chapter on the evolution of the parasitic habit and of its degrees of intensity, together with a consideration of allied problems would have been a welcome addition to the book. The mere mechanical presence of trypanosomes in the blood and lymph stream is not sufficient to account for the death of an animal or of man; how do they kill; by the production of rather mythical toxins, as claimed by some workers, or by destruction of the glycogenic activity of the liver, as more recent work appears to indicate?

Fixity of type among the Protozoa is one of the most marvellous of phenomena among the Protozoa. "The single individual which we study under the microscope has had no (such) history in the past and no promise for the future; its span of life as an individual is measured by hours or days only. It is the temporary trustee of a small portion of an organisation which has been parcelled out amongst unknown myriads of similar trustees..... Ultimately its possibilities of further vitality as a single individual are exhausted and it undergoes its final manifestation of vitality"; i.e., reproduction, either by asexual or sexual or both methods. Chapter 5 accordingly deals with modes of reproduction among the Protozoa and is one of the best written in the book. We are glad to note that the author emphasises that amongst the flagellate protozoa, 'division of the flagella does not apparently take place; new flagella are produced after division of the blepharoplasts (basal granules). He gives a figure from Kofoid and Swezy to shew the process of budding in *Councilmania lafleuri*, but remarks that this process is quite

different from the method of budding described for other amœbæ; a fact which throws some doubt upon the validity of this the genus *Councilmania*.

Having dealt with the life, i.e., structural organisation of the Protozoa, and having rightly excluded the spirochaetes from his survey, inasmuch as they are not Protozoa, the author next devotes a series of chapters to the special morphology and taxonomy of the different sub-phyla of the Protozoa. This section of the book will be found exceedingly useful to all protozoologists for it is very complete and is accompanied by most valuable keys to the common genera in all the groups. This information was badly wanted in some standard protozoological work, and the defect is now remedied. The classification of the Protozoa followed is the old one, into four sub-phyla, but it can easily be made to conform to the one suggested by Doflein and adopted by Wenyon in his recent "Protozoology" (1926).

Finally, in the concluding three chapters of the book, the author deals with his real main thesis, the correlation of vitality to living structure. This part of the book is in every way admirable. It should be read by all biologists, for the problems with which it deals are amongst the most fundamental in life. The phenomena of youth, maturity, senescence, "rejuvenation," and death among the Protozoa are fully considered. Changes in response to altered environment are fully considered and examples given. The whole of the work by past and present experimental workers on the subject is reviewed; chiefly, of course, with regard to the Ciliophora, since these have been more studied in this respect than any other sub-phylum. A large series of vitality graphs are given, shewing the response to different conditions in culture. The problem of sex among the Protozoa is dealt with in a most interesting manner; in common with other present-day workers, the author differentiates between copulation—which means the entire nuclear and bodily fusion of gametes; and conjugation, which is limited to the Ciliophora, and means the interchange and fusion of nuclear material between two individuals, without permanent union of the conjugating bodies. Merotomy experiments are dealt with, and the viability and vitality of cut off portions of different protozoa under different circumstances. "One unmistakable conclusion can be drawn from the many diverse observations and interpretations of the conditions under which fertilization occurs in ciliates, viz., the protoplasmic state with which conjugation is possible is induced in large part, but not wholly, by environmental conditions"..... "Whatever the changes due to metabolism are in a given case, the conclusion is forced upon us by the mass of evidence that given external conditions will provoke conjugations at one period of the life cycle and will have no effect in producing them at another period, while at the critical period of maturity external conditions may be entirely negligible." Parthogenesis is dealt with in its aspects of endomixis among the Ciliophora and autogamy among the Rhizopoda, Myxosporidia and Microsporidia. Just as among the Metazoa, so among the Protozoa, offspring may be produced by the development of an organism from an egg cell (or its equivalent) which has not been fertilised. An interesting account, given on p. 546, is one from Wenyon of autogamy in the cyst of *Entamoeba muris*.

Finally, the effects of reorganisation on the protozoal body, the origin of variations in the Protozoa, and the problems of heredity and variation are considered. An extensive bibliography is given at the end of the book, also special bibliographies after each different section.

Professor Calkins' book is a most important contribution to the science of protozoology from a side of it which is too often neglected,—its physiological and biological aspects. It is not a laboratory manual, but a book to study carefully, to read again and again for its most interesting and thoughtful subject-matter. If Wenyon's new "Protozoology" presents us with the whole subject of the morphology and parasitology of

the Protozoa, Calkins' "Biology of the Protozoa" presents us with an adequate and very informative study of what is at present known of their physiological and biological functions. Finally, a word must be said about the general get-up of the book. It is printed on glazed paper and very well published. This is presumably in order to assist in the reproduction of the numerous illustrations. These vary somewhat in quality; some of them—mostly new and original plates—are admirable in every way; others are not so satisfactory.

Professor Calkins' monograph is one which should be read—and especially in its final chapters—by every thoughtful student of biology, whilst it is essential to every worker upon protozoological problems. It is not a book for students, but it is one which will be highly valued by the zoological, biological and scientific world in general.

R. K.

Annual Report.

REPORT OF THE HEALTH OFFICER OF CALCUTTA, 1924. BY THE LATE DR. H. M. CRAKE, M.D., D.P.H. CORPORATION OF CALCUTTA, 1926.

It is with special sadness that we turn to review the last report on the public health of Calcutta by the late Dr. H. M. Crake, for the recent death of the author has robbed Calcutta city of one of her most energetic and pioneer workers. Dr. Crake's loss is almost irreplaceable, and the splendid work which he carried out during recent years in the improvement of the public health of Calcutta, in the introduction of maternity and child welfare schemes, the improvements in the milk and food supplies and the reduction of the death rate, is worthy of the highest admiration. It is not too much to say that Dr. Crake's death at an early age is due to his having worn himself out in his strenuous labours for the well-being of "the second city of the Empire."

Climatic Conditions.—Broadly speaking, 1924 was a dry hot year. That is to say the rainfall was much below the average. The total rainfall during the year amounted to only 51.13 inches. As the average is about 65 inches, this is a considerable defect.

Vital Statistics.—Before dealing with the vital statistics, a few words of explanation are necessary. On April 1st, 1924, the Calcutta Municipal Act became law. By this Act the boundaries of Calcutta were extended to include three adjacent municipalities, viz., Cossipore-Chitpore, Manicktolla, and Garden Reach. In this way Greater Calcutta, as it may be termed, came into being. At the same time two new wards were constituted, one (Ward 27) by dividing Ward 21 into 2 parts, and the other (Ward 18) by separating the eastern portion of Wards 19 and 20. The boundaries of Wards 24 and 25 were slightly altered and old Ward 18 (Hastings) was included in Ward 25. The "added areas," as the adjoining municipalities may conveniently be termed, were given ward numbers. Garden Reach became Ward No. 26, Manicktolla Wards 28 and 29 and Cossipore-Chitpore Wards 30, 31 and 32. Greater Calcutta thus comprises the town proper plus the added areas and is divided into 32 wards. It covers an area of 28,086 acres and has a population of 10,77,264.

The Death-Rate.—The total number of deaths in Greater Calcutta during the year was 30,822 deaths, equivalent to a death-rate of 29.8 per thousand calculated on the census population of 1921, or 27 per thousand if the 1,800 imported deaths are excluded. These imported deaths obviously mean at least 5,000 cases and 10,000 contacts. Assuming that from 15 to 20 per cent. are suffering from infectious diseases, these figures give

some idea of the stream of infection constantly pouring into the city.

VARIATIONS IN THE MORTALITY FROM VARIOUS DISEASES.

Plague.—Only 31 deaths from plague in the town proper were recorded, or less than half the number registered in 1923.

Cholera.—Although the mortality was slightly higher than in 1923, the epidemic of cholera this year was a comparatively mild one. The total number of deaths in the town proper was 1,022 as compared with 914 in 1923.

Ward 19, Entally, has the highest death rate, 61.8 per thousand; the principal causes of death were dysentery 10 per cent., respiratory diseases 18 per cent., tuberculosis 4 per cent. The other wards with a high death rate were Wards 24, 21 and 20, Watgunge, Ballygunge and Beniapurkur.

Death Rates amongst Males and Females.—Amongst males there were 15,351 deaths, or 24.8 per thousand, whilst amongst females, although only 11,375 deaths were recorded, the death rate was no less than 39.1 per thousand. For example, in Ward 7 the general mortality was only 17.1 per thousand whereas amongst females it was 31.5 per thousand, or more than double that amongst males (14.2 per thousand).

The infantile mortality during the year was 294 per thousand births. During the last few years there has been a downward tendency in the infantile mortality figures. There was a distinct falling off in the birth registration during the last quarter of the year, probably on account of the vaccination campaign that was started at this time.

The highest infantile mortality was registered in Ward 15 (Colinga). The mortality was 453 per thousand. This same ward also showed a very low birth rate, 12 per thousand. This fact supports the suggestion that the high infantile death rate may be exaggerated by defective birth registration.

The principal causes of death amongst infants were bronchitis (27 per cent.), congenital debility (20 per cent.) and tetanus neonatorum (15 per cent.).

The high death rate is of course mainly due to ante-natal conditions, and cannot be remedied by baby clinics, milk depôts, etc. With so many sickly, poorly nourished mothers living under insanitary conditions, puny weakly babies are inevitable. Whilst poverty is the direct cause of so many expectant women being ill-fed and badly housed, ignorance, child marriage, the purdah system and diseases all combine to undermine their health. Although many premature births result from the conditions briefly noted above there is no doubt that a large proportion is due to syphilis. Making every allowance for the well-known effect of chronic malaria in causing premature delivery, the number of still-births is undoubted evidence of the widespread prevalence of venereal disease.

It is obvious that there is little hope of these causes of infantile mortality being removed, without a radical alteration in the social and economic condition of the women of Calcutta.

Tetanus neonatorum is an entirely preventable disease due to "dirty midwifery." It is practically unknown amongst the thousands of cases attended by the Corporation midwives, and the decline in the mortality from this cause in Calcutta proper was apparently due to the work of the maternity centres. The increase in the death rate this year is due to the inclusion of the added areas.

PRINCIPAL CAUSES OF DEATH.

Cholera.—It is satisfactory to be able to record another only mild epidemic of cholera. The number of deaths from cholera in Calcutta proper was only 1,022 or 1.1 per thousand. This is slightly higher than last year's figure but much lower than the quinquennial average which is no less than 2,034 or 2.2 per thousand.

There were 175 deaths from cholera in the added areas, equivalent to 1.4 per thousand.

In a recent report it was suggested that there was a certain periodicity in the prevalence of cholera in Calcutta. A study of the returns of the last 35 years seemed to indicate a cycle of about 10 years' duration. As epidemics in Calcutta tend to follow more or less closely those in Bengal, it was obviously necessary to study the returns for the province as well. Major Stewart, I.M.S., Officiating Director of Public Health, Bengal, states:—"The question of the periodicity of cholera in Bengal has been looked into at various turns and the conclusion reached has been that while there is undoubted evidence of cyclical periodicity when studied over a large number of years, this is of too irregular and varying a nature to state in precise terms. Thus, occasionally, there appears to be a definite 3 years cycle at various periods, at other periods 6, at other periods 10 years, etc. A study of cholera elsewhere, e.g., Madras, suggests the same difficulty. Russell suggests a 6 years cycle in Madras. Bellevue claimed 'a three-year cycle, while a sixteen year cycle is supposed to be typical of Asiatic cholera (Newman).' On studying the graph of Calcutta two encouraging features strike one. (1) The interval between severe epidemics is undoubtedly becoming longer. Compare the period 1890-1908, with severe epidemics in 1891, 1896, 1900, 1907, and 1908, i.e., the longest interval 6 years, and the period 1909-1925, with only one severe epidemic in 1919. (2) For the first time for many years the cholera mortality has remained at a low level, i.e., about 1 per mille for three years in succession (1923-25).

Though not so late as the 1923 epidemic, this year's outbreak was distinctly late in assuming epidemic form, there being no marked rise in the mortality till the beginning of March. The acute phase lasted about two months, but after dropping suddenly in the second week of May and remaining at a low level for five weeks, a sudden terminal rise, lasting a fortnight, occurred in June. The outbreak then rapidly subsided."

Small-pox.—In view of the fact that the severe epidemic of 1925 commenced in the latter part of 1924, it is worth while briefly reviewing the incidence of small-pox during the last four years. A very severe outbreak occurred in 1920. This was followed by a true non-epidemic year in 1921. In 1922 a most unexpected local outbreak occurred in Districts I and III. In 1923 another much milder and more localised outbreak occurred in District I. It was obviously of the utmost importance that there should be an intelligent anticipation of the probable course of events in 1924. Watching the returns carefully during the latter part of 1923, it was found that the city remained free from small-pox for several weeks. This alone enabled one to predict confidently that there would not be a severe epidemic in 1924. During the latter part of a non-epidemic year, scattered sporadic cases frequently occur. If they occur regularly week by week, with hardly a break, this is a true sign of an epidemic approaching. If on the other hand they occur at irregular intervals, little or no importance need be attached to them.

Plague.—The recrudescence of plague was the mildest ever recorded in Calcutta since the city was first infected.

Malaria.—The number of deaths registered as due to malaria in Calcutta proper was 1,262 or 1.4 per thousand, a very considerable increase compared with last year's figure of 1,069 or 1.2 per thousand.

Dysentery and Diarrhoea.—The total number of deaths from diarrhoeal diseases in Greater Calcutta was 3,252 or 3.1 per thousand. Of these, 2,794 occurred in the town proper, and 458 in the added areas. The former figure is almost the same as last year (2,734). It is satisfactory to note that the returns for the past three years represent a marked improvement over those for the period 1918-1921. In 1919 the number of deaths reached the very high figure of 3,509.

Tuberculosis.—The total number of deaths from tuberculosis in Greater Calcutta was 2,492 or 2.4 per thousand. Of these, 2,232 or 2.5 per thousand occurred in the town proper, and 260 or 2.0 per thousand in the added areas. It is discouraging to find that the improvement which was noted last year has not been maintained.

In Calcutta the whole of the mortality from tuberculosis is due to pulmonary tuberculosis. This variety of the disease accounts for 2,367 out of a total of 2,492 deaths from tuberculosis, or no less than 94 per cent. There were only 125 deaths from other forms of tuberculosis, of which 106 were registered as abdominal tuberculosis, and 19 as tuberculosis of other organs. The extremely small percentage of fatal cases of "surgical tuberculosis," i.e., tuberculosis of bones, joints, and glands is probably due to the rarity of bovine tuberculosis in Bengal. It is necessary to point out that this does not apply to pigs, which often suffer from tuberculosis of the glands. The death rate amongst Mohammedans was 3.0 per thousand, a slight increase compared with last year's rate of 2.8. Amongst Hindus it was 2.3 per thousand, as against 2.1 in 1923. The most striking change in the returns, however, is the high mortality amongst Indian Christians. This has risen from 2.8 per thousand to 3.8 this year. The mortality rate is calculated on a very small number of cases, however, and is liable to violent fluctuations. The death rate amongst non-Asiatics and Anglo-Indians was 2.7 per thousand. The worst feature of the returns, however, is the terrible mortality amongst girls and young women.

Age period.	Tuberculosis death-rates.	
	Males.	Females.
10-15 years	.. 0.45 per thousand	2.2 per thousand
15-20 "	.. 1.1 "	6.6 "
20-30 "	.. 2.0 "	6.4 "
30-40 "	.. 2.3 "	5.8 "
All ages	.. 1.8 "	3.8 "

Now up to the age of ten years, there is no trace of increased susceptibility amongst females. In fact young boys are, if anything, more susceptible than girls. What is the cause of the tremendous change in the incidence of tuberculosis, which occurs at or about the tenth year?

It must be something which affects the girl and not the boy. What is it? Between the ages 15 and 20 years for every boy that dies of tuberculosis *six girls die*. What is the reason for this appalling state of affairs?

Dr. Crake is convinced that it is the retention of the purdah system in the densely populated gullies of a congested city that dooms so many young girls to an early death from tuberculosis. In less densely populated areas, where detached houses with compounds are possible, the purdah system could be adhered to without seriously affecting the health of the inmates of the zenana. In a great city it is difficult to secure absolute privacy without shutting out light and air, as houses in narrow lanes and gullies are almost certain to be overlooked. Consequently the zenana is usually situated in the inner portion of the house, ill-lighted and ill-ventilated, but effectually screened from observation. Another very important factor in the aetiology of tuberculosis amongst girls and young women is early marriage, which subjects immature females to the strain of repeated pregnancies and prolonged periods of lactation. Lastly, attention should again be drawn to the many thousands of cases of tuberculosis always present in Calcutta. This is apt to be overlooked as these reports deal almost exclusively with deaths. At a very modest estimate, assuming that there are four or five living cases for each death registered, there are probably about 10,000 cases of tuberculosis in the city at any given time. In the great majority of cases no precautions are taken against the spread of infection. To speak plainly

thousands of consumptives are constantly spitting all over the place. Can one wonder at the prevalence of the white plague in Calcutta? An anti-tuberculosis scheme which included the appointment of a tuberculosis officer with eight assistant medical officers (for systematic house to house visiting), a dispensary and a publicity bureau have been approved by the Health Committee.

Kala-azar.—A further ominous rise in the mortality from kala-azar has occurred. The number of deaths recorded as due to this disease was 593 in Calcutta proper, or 0.65 per thousand, as compared with 501 or 0.55 per thousand in 1923. Kala-azar has increased by leaps and bounds during the last few years. In 1919 for example, there were only 109 deaths. By 1922 the number had risen to 287 or 0.31 per thousand. Last year it was 501, and this year nearly 600. Making every allowance for the fact that a large proportion of the cases are imported, there seems no doubt kala-azar is becoming more prevalent in Calcutta.

Food Inspection.—There is nothing of any special interest to note about the ordinary routine of the work done by the food inspectors during 1924. The trite old complaint of the absolute inadequacy of the food inspecting staff is still a cry in the wilderness and it is practically impossible to expect better and more effective supervision and control of food-stuffs unless a more adequate staff is provided. For the last decade or so the number of food inspectors has remained fixed, though the number of food shops, hotels, restaurants, etc. has increased considerably.

Vaccination.—There were 266 deaths (town) from small-pox in 1924 against 157 of the previous year. Small-pox began to appear in an epidemic form towards the end of the year. The Health Department was fully prepared for the emergency beforehand and an adequate supply of vaccine lymph was kept in stock. Vaccination was pushed on a vigorous scale as the principal preventive measure against this terrible scourge. As many as 1,20,477 persons were vaccinated in the town proper and the number is almost thrice the figures for the preceding year.

Primary Vaccination.—The total number of primary vaccinations performed during the year under report in the town area was 21,270 against 17,223 of the previous year. In the added areas 3,977 primary vaccinations were performed. These figures are for nine months from April to December.

The Buldeodas Maternity Home.—Thanks to the generosity of a public-spirited citizen, who came forward with the very handsome gift of Rs. 50,000 towards the cost of establishing a maternity home, a fully equipped maternity home was opened in the northern end of the city in March 1924. The Buldeodas Maternity Home was declared open on the 16th of February by Her Excellency the Countess of Lytton in the presence of His Excellency the Governor of Bengal, Rai Bahadur Dr. Haridhan Dutt, the Chairman of the Corporation, and a distinguished gathering of the citizens of Calcutta.

Correspondence.

THE TREATMENT OF AMOEBIC ABSCESS OF THE LIVER.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—It has come to my notice that you have quoted fully a recent correspondence on the subject of the treatment of amoebic abscess of the liver by emetine alone. As I have had no opportunity of replying to Dr. Manson-Bahr's criticisms I hope that you will be able to find space for the following notes.

(1) Dr. Manson-Bahr has not disputed my statement as to the pathology of the disease, so presumably he accepts the view that an amoebic hepatic abscess is analogous to a gumma or a psoas abscess. This is very important, as no one deliberately operates on gummata, and tubercular abscesses are only dealt with surgically for mechanical reasons. If the pathology is correct, treatment by medical means only follows automatically.

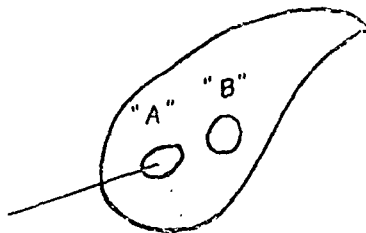
(2) As to the necessity for the aspiration needle to make the diagnosis, I have to disagree entirely. In this connection it is of interest to note that Dr. Manson-Bahr in case No. 13 published with Low, Pratt, and Gregg in the *Lancet* of May 1923, p. 941, records the fact that he had a case under observation for 22 days before he aspirated and found 64 ozs. of liver pus!! Ordinary methods of examination, especially if x-rays are used, will be found enough by most people.

(3) The size of the abscess is naturally of great importance and I agree that, just as in tubercular pleurisy it may be necessary to aspirate, so it may be desirable to relieve tension in cases of hepatic abscess, but it should be borne in mind that this relief is only necessary for mechanical reasons, and that in the case of tubercular pleurisy as much fluid as possible is allowed to be absorbed in order that the patient, so far from suffering from toxic effects, may derive benefit from the contained immune bodies, etc. The contents of the amoebic hepatic abscess were shown by Kartulis in 1885 to be sterile and there is no evidence to show that the contents of the amoebic abscess are toxic. Surely it is the amoebæ and their immediate products which are toxic and not the sterile contents of the abscess.

(4) As regards the effect of emetine being miraculous, it certainly is, but what happens is that the killing of the amoebæ removes a barrier and opens the way to the absorption of the matter; or, in other words, a very small key can open a very large door. It is patent that power cannot be measured by size. Strychnine grs. 2 will kill a full-grown man, and the amount of vitamins required to keep one in health is not measured in pounds or even ounces.

(5) The question as to what happens in cases of multiple abscesses, in which one abscess is aspirated and the second or others escape, has not been answered. The patient will have had emetine and if one un aspirated abscess recovers why should not all have done so on emetine alone? Maclean quoted 48 cases of which 11 were multiple, while Waring gives the frequency as 36 per cent. in a series of 300 cases. The question is, therefore, important.

A simple diagram will show the point.



"A" is aspirated and "B" escapes the needle. It is claimed, when the patient recovers, that the untouched abscess is cured by the aspirating needle which has not reached it. But should not the emetine get the credit?

(6) My statement that the longer the abscess had lasted, the easier relatively it was to cure proved rather upsetting to Dr. Manson-Bahr and to Col. Thurston, but there is nothing more in it than the recognition of the fact that when a patient has been putting up a fight, sometimes for quite a long time, his resistance and defence forces will have improved immensely and when he receives the very great aid of the emetine he is able to deal with his enemy with greater speed and efficiency. I am referring, of course, to the specific immune bodies

and not to the physical condition. In such a disease as malaria this intrinsic resistance is very obvious; it is well known to exist in syphilis; whilst Sampson Handley showed that even in carcinoma the cancer does not have a complete walk over; so that to claim an increasing measure of resistance to such an organism as the amoeba does not appear to me difficult to understand or to be really worth arguing about.

(7) As to the real value of aspiration it is recorded by Tomes in 1884 that with the aspiration method the death rate was 75 per cent.; 31.6 per cent. by the open operation; and only 14.4 per cent when aspiration was combined with medicinal treatment. This record, which is not unique, points to the immense value of the medicinal treatment and suggests that *per se* aspiration is not much good. The last quotation is taken from the paper by Manson-Bahr, Low, Pratt and Gregg already referred to.

(8) The usual method of giving emetine is to give 12 grains in one grain doses on 12 consecutive days. I have now for a number of years treated my cases with one grain of emetine on 3 consecutive days followed by a 4-day interval and then with one grain for 2 days or 3 days with the interval to make the week, and so on as long as I consider it necessary or desirable. The article on the pathology of prolonged emetine administration by Young and Tudthorpe in the *Transactions of the Royal Society of Tropical Medicine* for March and May 1926 seems to give valuable support to the intermittent method of treating amoebiasis.

(9) Finally, I would say that perusal of the many records that have now been published, but particularly of Dr. Leonard's case published in the *Annual Medical Report, Nigeria, 1922*, of Capt. Sargood Fry's two cases reported in the *Indian Medical Gazette* for October 1924, and of Dr. Manson-Bahr's own statements in the *Tropical Diseases' Bulletin* for January and April 1925 will leave very little doubt in one's mind that surgical interference in the treatment of amoebic hepatic abscess is unnecessary, and that emetine alone is as sufficient a treatment for the condition as mercury and iodides are, or perhaps I should say were, for gummata.—Yours, etc.,

V. S. HODSON, M.B., M.R.C.P.

LONDON, W.1.

24th August 1926.

IODEOL IN PULMONARY TUBERCULOSIS.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—Within the course of four months I have used Iodeol Viel in six cases of pulmonary tuberculosis with excellent results. All my patients, except one, were in the third stages of the disease, and two of them with fairly big cavities in the lungs. I gave Iodeol, one ampoule of 1 c.c., twice a week intramuscularly into the deltoid muscle of the arms and into the fleshy parts of the thighs. These injections were absolutely painless and the little discomfort which they had after repeated injections passed off quickly without much inconvenience to the patients. In all the cases the hectic temperature went down rapidly with each successive injection. It relieved their distressing cough and diminished sputum steadily. The signs in the chest cleared up after a course of eight injections. One of my cases in the second stage of the disease has been completely cured with a course of sixteen injections. This patient has increased in weight and strength wonderfully and is now attending to his daily duties happily.

The makers claim that Iodeol is a particularly active producer of hyperleucocytosis and consequently reinforces the natural defensive means of the organism against pathogenic microbes; it raises the opsonic index and behaves as a parasitotropic drug especially as

regards Koch's bacillus, the protective envelope of which it seems to destroy.—Yours, etc.,

K. P. S. ROY, L.M.P. (Camp.)

S. A. Surgeon, Darjeeling.

DARJEELING,

18th September 1926.

THE TREATMENT OF PLAGUE.

To the Editor, THE INDIAN MEDICAL GAZETTE.

SIR,—I read with very great interest the suggestion made in your issue for August 1926 by Dr. D. A. Turkhud to treat cases of plague by the administration of hypertonic saline solution intravenously.

I can recall a suggestion which I made at a meeting of the Surat Medical Union in 1920, in a discussion on the treatment of plague. One can only understand the pathology of plague when one comes to examine cases at post-mortem examination. The majority of cases die before the sixth day of illness and show profound pathological changes in the heart and other organs. The condition present is a septicæmia and a hæmorrhagic septicæmia at that, and treatment must be directed to combating such septicæmia, just as in surgical or puerperal septicæmia. This means the introduction of large quantities of normal saline, either subcutaneously, intravenously, or by Murphy's method of proctolysis per rectum. The fluid introduced dilutes the toxins, raises the blood pressure—which tends to become very low in plague patients,—and assists micturition and sweating. I am now glad to see so expert a laboratory worker as Dr. Turkhud coming forward in support of such a suggestion on bacteriological grounds.

As pointed out in Castellani and Chalmers' "Manual of Tropical Medicine," the characteristic post-mortem features of a case of plague are buboes and hæmorrhages. The coagulability of the blood is diminished. Hence treatment should be directed towards the prevention of hæmorrhage and towards raising the coagulability of the blood, also, if possible, towards killing the bacilli. Dr. Andrew Balfour has suggested the use of mercurochrome intravenously in plague; whilst, in the same connection, the paper by Dr. Dudgeon (*Lancet*, 23rd January 1926) is very helpful; he has treated a large number of cases of septicæmia of different origins with mercurochrome and with perchloride of mercury intravenously, and advocates that the former drug should be used in dilutions of less than 1:100 in strength. For intravenous use he advocates a 1:200 to a 1:700 solution of mercurochrome, giving doses of 10 c.c. or so at a time. In the "epitome" in the *British Medical Journal* of the 26th August 1926 it is stated that "the intravenous administration of mercurochrome is justifiable in cases with a positive blood-stream infection.....The percentage of recoveries appears to be higher than can be attributed to mere coincidence." With regard to perchloride of mercury Dr. Dudgeon finds 1/16th of a grain (5 c.c. of a 1:1250 solution) given intravenously of distinct benefit in septicæmic conditions.

Recently—*British Medical Journal*, epitome, 7th August 1926; 29th May 1926—the intravenous administration of 5 c.c. of a 1:50 solution of acriflavine has been advocated in cases of gonorrhœa. A 10 c.c. syringe, half full, should be used, 5 c.c. of venous blood aspirated into the syringe, and the mixed blood and acriflavine solution be slowly injected. Of 168 cases treated, it is claimed that 153 were cured. Disinfection of the blood stream by this method is said to be more efficacious than by any local injections. The treatment may be repeated daily during the first two or three days if abortive treatment is desired. The drug being excreted by the urinary organs, it will reach such situations as the glands of Bartholin and other areas not readily accessible to local medication.

Recent publications in your *Gazette*—such as Major Manifold's report on dysentery in Poona, reviewed in your columns, and a review of the health of the British Army for 1923—have emphasised that the commonest type of dysentery in India is of bacillary, and not of amoebic, origin, although fortunately very severe cases are rare. In such cases anti-dysenteric serum is the sheet-anchor of treatment; thus Graham (*Lancet*, 12th January 1918) advocates doses of 40 to 60, or even 100 c.c., given intravenously, and I have personally used this method in severe cases of bacillary dysentery, with excellent results.

For plague, we have a specific anti-serum; Yersin's. Would it not therefore be advantageous to combine this serum with the use of hypertonic saline, as advocated by Dr. Turkhud? A preliminary test of the patient's tolerance to the serum could, of course, be carried out by the giving of a fractional dose as a preliminary measure.

Further, it has been shown that the intravenous injection of from 0.5 gm. to 1 gm. of calcium chloride in 10 per cent. solution combats the tendency to a diminished coagulation time of the blood, increases the systolic heart beat and raises the blood pressure. This drug, again, might well be combined with an intravenous injection of hypertonic saline in cases of plague. Recourse might also be had to the various tissue preparations for promoting the coagulability of the blood,—or to "Hæmostyl" as a serum with a special action in cases of hæmorrhage. Pickering and Hemingway, in the *British Medical Journal* for the 19th June 1926, have shown that the simultaneous administration of calcium chloride with an anti-serum will also prevent serum-sickness.

The possibilities of intravenous medication in plague are deserving of further study. Measures are called for to combat the septicæmia, to check hæmorrhage, to eliminate toxins, and to raise the coagulability of the blood. Our present lines of treatment of the disease are quite inadequate. Is there no possibility of further progress?—Yours, etc.,

JEHANGIR B. DORDI, L.M. & S. (Bom.),
F.R.C.S. (Ire.).

NAVSARI, SURAT DISTRICT.

11th September 1926.

Service Notes.

APPOINTMENTS AND TRANSFERS.

Lieutenant-Colonel J. R. J. Tyrrell, I.M.S., an Agency Surgeon, on return from leave, is posted as Residency Surgeon, Western India States Agency, with effect from the 12th September 1926.

Lieutenant-Colonel R. F. Baird, I.M.S., is appointed to officiate as Inspector-General of Civil Hospitals, United Provinces, with effect from the 9th October 1926 and until further orders.

The services of Lieutenant-Colonel F. C. Fraser, I.M.S., are replaced at the disposal of the Government of Madras with effect from the afternoon of the 7th August 1926.

Major J. B. Lapsley, M.C., I.M.S., is appointed to be Assistant Director-General, Indian Medical Service (Stores), in succession to Lieutenant-Colonel G. G. Hirst, I.M.S., with effect from the 1st November 1926,

or such subsequent date, as he may assume charge of his duties, and until further orders.

Major P. D. Chopra, I.M.S., made over charge of the duties of Superintendent, Borstal Institution and Female Jail, Lahore, to Major N. Briggs, I.M.S., on the forenoon of 5th September 1926.

Major M. L. Puri, I.M.S., made over charge of the duties of Superintendent, District Jail, Multan, to Dr. K. K. Mehta on the afternoon of 31st August 1926.

Major N. D. Puri, I.M.S., made over charge of the duties of Medical Officer of the Central Jail at Montgomery to Khan Bahadur S. Nazir Hussain, Civil Surgeon, Montgomery, on the afternoon of the 3rd August 1926.

Major W. J. Simpson, I.M.S., an officiating Agency Surgeon, on return from leave, is posted as Agency Surgeon in Bhopal, with effect from the 14th September 1926.

The services of Captain J. C. Chukerbertti, M.B., I.M.S., are placed temporarily at the disposal of the Government of Bengal, with effect from the date on which he assumes charge of his duties.

To be temporary Lieutenants.

Patit Paban Chowdry, M.B., B.S. Dated 31st August 1926.

Abdul Majid Khan, M.B., B.S. Dated 31st August 1926.

Hari Krishna Handoo, M.B., B.S. Dated 1st September 1926.

Prabhakar Narayan Sathe, M.B., B.S. Dated 1st September 1926.

Balwant Rai Bhaskar, M.B., B.S. Dated 1st September 1926.

Sangham Lal, M.B., B.S. Dated 4th September 1926.

Shamsul Haque Wali Mohamed Siddiqui, M.B., B.S. Dated 7th September 1926.

Tharuvi-parambil Reghunatha Pai Rama Pai, M.B., B.S. Dated 26th September 1926.

LEAVE.

Major-General R. Heard, C.I.E., M.D., K.H.S., I.M.S., Surgeon-General with the Government of Bengal, is granted leave on average pay for 4 months pending retirement with effect from the 1st November 1926 or from such subsequent date as he may avail himself of it.

Colonel C. H. Bensley, C.I.E., K.H.P., I.M.S., Inspector-General of Civil Hospitals and Prisons, Assam, is granted 4 months leave on average pay, preparatory to retirement, with effect from the 1st November 1926 or any subsequent date on which he may avail himself of it.

Colonel A. W. R. Cochrane, M.B., F.R.C.S., I.M.S., Inspector-General of Civil Hospitals, United Provinces, is granted leave on average pay for 5 months and 27 days combined with leave on half average pay for 1 year, 10 months and 3 days, with effect from the 9th October 1926.

Lieutenant-Colonel J. B. D. Hunter, O.B.E., I.M.S., an Agency Surgeon, is granted leave on average pay for 8 months combined with leave on half average pay for 1 year and 7 months, with effect from the 12th September 1926.

Major Sir T. J. Carey-Evans, Kt., M.C., I.M.S., an officiating Agency Surgeon, on reversion to the Foreign and Political Department, was granted leave on average pay for 4 months from 29th April 1924, and in continuation furlough for 1 year and 8 months from the 29th August 1924.

Captain B. G. Mallya, I.M.S., Superintendent, Alipore Central Jail, is allowed leave for 16 months, viz., leave on average pay for 8 months, with effect from the 14th October 1926, or any subsequent date on which he may

be relieved, and leave on half average pay for the remaining period.

PROMOTIONS.

Majors to be Lieutenant-Colonels.

Norman Skinner Simpson. Dated 1st September 1926.

Kanwar Shumshere Singh. Dated 1st September 1926.

Frederick Charles Fraser. Dated 1st September 1926.

Captains to be Majors.

Frank Griffith, M.B. Dated 8th September 1926.

John Patrick Huban, O.B.E. Dated 23rd September 1926.

William John Sivewright Ingram, M.C., M.B. Dated 30th September 1926.

Robert Hay, M.B. Dated 7th October 1926.

Michael Murphy, M.C. Dated 12th October 1926.

Jehangir Hormusji Oonvala. Dated 18th October 1926.

Herbert Edward Murray, M.B. Dated 20th October 1926.

William Miller Will, M.B. Dated 21st October 1926.

Temporary Lieutenants to be temporary Captains.

Mohan Singh Segat. Dated 12th September 1926.

Chandu Lal Malhotra. Dated 14th September 1926.

Rajindar Singh Sandhu. Dated 14th September 1926.

Rama Shankar Varma. Dated 22nd September 1926.

Shiv Das Suri. Dated 24th September 1926.

Kashi Ram Sahgal. Dated 26th September 1926.

Chandiram Ghurbamal Malkani. Dated 28th September 1926.

RESIGNATIONS.

Captain Dharendra Prasad Bose. Dated 1st September 1926.

Captain Gopal Das Malhotra. Dated 1st September 1926.

Captain Balkrishna. Dated 1st September 1926.

Captain Aswini Kumar Nandi. Dated 1st September 1926.

Captain Pramatha Nath Ghosh. Dated 1st September 1926.

Captain Palathunkal Mathen Matthai. Dated 1st September 1926.

Captain Antonelli Francis Bartholomeu Saldanha. Dated 1st September 1926.

Captain Chhaganlal Motichant, Contractor. Dated 1st September 1926.

Captain Amulya Prasad Maitra. Dated 1st September 1926.

Captain Manchershaw Ardeshir Mithavala. Dated 1st September 1926.

Captain Madhav Vithal Pathak. Dated 1st September 1926.

RETIREMENTS.

Major-General Sir Robert Charles MacWatt, Kt., C.I.E., M.B., F.R.C.S., F.R.C.P.E., K.H.S. Dated 1st October 1926.

Lieutenant-Colonel J. W. Cornwall. Dated 29th July 1926.

Major W. L. Forsyth, M.B. Dated 28th August 1926.

NOTES.

PASS LIST, L.T.M. (BENGAL), 1926.

At the examination for the License in Tropical Medicine, Faculty of Tropical Medicine, Bengal, held at the Calcutta School of Tropical Medicine in October 1926, the following 13—out of 27—candidates qualified:—

1. Chakravarti, Kamakhya- Sub-Asst. Surgeon under charan. Assam Government.
2. Chorley, Alice Sophia .. Diplomate, King Edward Medical College, Lahore, Madunapalli, Chittoor.
3. Choudhury, Sushil Krishna L. M. F., Hooghly District.
4. de Araujo, Antonio Vicente Sub-Asst. Surgeon, C. P. Anacleto.
5. Doshi, Jatashankar Ramji- L.C.P. & S. (Bomb.), bhai. Rajkot City.
6. Dutta, Dharendra Mohan .. M.B. (Cal.), Assistant Surgeon, B. N. Ry. Hospital, Kharagpur.
7. J a m d a r, Chandrashekhar Sub-Asst. Surgeon, Govt. of C. P. Madhav Rao.
8. Mehrotra, Jagmohan .. Sub-Asst. Surgeon under U. P. Government.
9. Mitra, Surendranath .. Sub-Asst. Surgeon, Govt. of Bihar and Orissa.
10. Jemadar, Ram Rakha, I.M.B. Indian Station Hospital, Kohat.
11. Rangayya, Chillara .. Sub-Asst. Surgeon, Madras Government.
12. Sarkar, Harendra Mohan .. L. M. P. (Calcutta), Murshidabad.
13. Sheorey, Mahadeo Sitaram Sub-Asst. Surgeon, Govt. of C. P.

Publishers' Notice.

SCIENTIFIC Articles and Notes of interest to the profession in India are solicited. Contributors of Original Articles will receive 25 reprints *gratis*, if asked for at the time of submitting their manuscripts.

Communications on Editorial Matters, Articles, Letters and Books for Review should be addressed to THE Editor, *The Indian Medical Gazette*, c/o The Calcutta School of Tropical Medicine, Central Avenue, Calcutta.

Communications for the Publishers relating to Subscriptions, Advertisements, and Reprints should be addressed to THE PUBLISHERS, Messrs. Thacker, Spink & Co., P. O. Box 54, Calcutta.

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The Editors of the *Indian Medical Gazette* cannot advise correspondents with regard to prescriptions, diagnosis, etc., nor can they recommend individual practitioners by name, as any such action would constitute a breach of professional etiquette.

SUPPLEMENT.

THE INDIAN MEDICAL YEAR, 1926.
A REVIEW.*

IN reviewing the Indian Medical Year, 1926, the reviewer would like—once again—to express his most grateful thanks to the numerous contributors who have helped to make the review a symposium by different writers rather than a review by a single reviewer.

DISEASES OF THE TROPICS, EPIDEMIOLOGY, SYMPTOMATOLOGY AND TREATMENT.

Malaria.

With regard to *epidemiology* several important papers have appeared. Perhaps the most important is the publication by Lieut-Col. S. R. Christophers and Major J. A. Sinton of a malaria map of India. This represents a first attempt—in co-ordination with the reorganisation of the Central Malaria Bureau, Government of India—to envisage the malaria problem of India as a whole. As was to be expected, the Punjab, and localised areas in Sindh and near Bhopal in the Central Provinces are areas which are known to be liable to fulminant epidemics, whereas parts of Assam, Bengal, Bihar and Orissa, the Central Provinces and the jungly hill tracts and ghats of the Bombay and West Coast provinces and areas shew hyperendemicity. The paper is accompanied by a most useful bibliography which will be of great value for reference for workers in malariology. P. A. Dalal and B. S. Chalam deal with the malaria problem in Bombay, where the disease has recrudesced in severe epidemic form in 1926. Here several problems have to be considered. In connection with the Back Bay Reclamation scheme, the carrying species prevalent on the seashore have been found to be *A. subpictus*, *A. stephensi*, *A. culicifacies* and *A. vagus*, all of which can breed in salt water. Areas regularly inundated by the tide do not require attention, but areas subject only to inundation by the spring neap tides and seepage areas do, and it was found that the range of flight of mosquitoes bred out in such areas may be up to half a mile. The excellent anti-malarial work in connection with the Back Bay Reclamation scheme has been one of the few bright features about that ill-starred venture. In the Bombay cotton mills matters are different: there are many extensive tanks, once used as a source of water supply but now left derelict by the introduction of electric drive in place of steam power for the mills. Here Paris green has proved an effective larvicide, but it is expensive. Oiling by a mixture of 3 parts of residual oil and 2 parts of kerosine, reinforced by 0.1 to 0.2 per cent. of castor oil, at the rate of 1 gallon per 100 square feet of surface can be depended on and is cheap and efficient, whilst a measure of special value is to provide artificial mosquito breeding places in households which can be systematically emptied once a week. M. O. T. Iyengar deals with the *Anopheline* fauna of a swamp in Bangalore—a most interesting study of local conditions. This is a seepage area between the Sankey reservoir and the Malleswaram lake in which no less than ten species of *Anopheles* were found breeding. A study is made of the selective

breeding sites of the different species and of the relationship of the swamp to the malariousness of the localities concerned.

Capt. P. N. Mitra deals with malaria at Pasighat, Assam. Malaria first became prevalent in the station in 1916, 1917, 1918. Eight species of *Anopheles* were found breeding in the area, of which *A. maculatus* was the worst carrier. Jungle clearing in previous years had apparently led to a great increase of this species, and deforestation in the station should be stopped. Oiling by drip cans was chiefly resorted to and the 1925 returns have shewn a remarkable diminution on those for 1924. Dr. T. H. Bishop deals with malaria as a railway problem on the E. B. Railway, and complains that sites for stations are often decided upon without reference to the health officials, instancing some remarkably bad selections from the point of view of favouring malaria. Propaganda, the proper selection of station sites, the avoidance of borrow pits, proper ventilation of quarters, the proper construction of the bathing tank and general sanitary measures are advocated. Funds being decidedly scanty, he shows how much can be done with a modest staff to improve the health of the community. Dr. J. N. Leitch pleads for the efficient isolation of malarial patients in hospital. Such patients frequently convey malaria to other patients in the same hospital. Taking patients suffering from beriberi at Jeram hospital in Assam, the incidence of malaria amongst them when malaria cases were not admitted to the hospital was 1.66 per mensem, when mosquito nets were employed was 2.87, when the hospital was efficiently screened by wire and malarial cases admitted was only 0.45 per mensem. Efficient screening can be effected at a cost of Rs. 300 per 1,000 feet with painted wire gauze, Rs. 400 for galvanised wire, and Rs. 1,000 for copper wire. Where America leads, India has not yet attempted to follow.

A. C. H. Searle (*R. A. M. C. JI.*, March) discusses the much-vexed question of the result of anti-malaria measures in Lahore Cantonment (formerly Mian Mir). Here a complete stoppage of irrigation was effected in 1904-1906. The immediate result was to convert the cantonment into a dusty desert. The official returns showed a great diminution in the hospital admissions for malaria, but the writer points out that there was an official order that cases were only to be returned as malaria if parasites were found in their blood. Such a measure is in itself an "anti-malarial" one; large numbers of actual cases of malaria were treated as out-patients and the returns are valueless. He lays stress on the inadequate drainage system and hopes that good results will follow from Colonel Mackenzie's deep absorption-pit system of drainage.

Turning to *symptomatology*, K. L. B. Mallik records hæmoptysis in a case of what was apparently malaria with pseudo-pneumonic symptoms, where *P. falciparum* was found in the blood films, but all examinations for tubercle bacilli were negative. Major T. A. Hughes discusses the origin of urobilinogen in the urine of patients with malaria. In uncomplicated cases of chronic malaria with latent hæmolytic jaundice there is no relationship between the degree of urobilinuria and that of *bilirubinæmia*. In chronic malarial cases suffering from toxic jaundice, urobilin disappears from the urine when the condition of the glandular cells of the liver does not permit bile pigment to enter the bowel. The conclusion is drawn that in malaria the urobilin originates in the intestine from bilirubin. Major R. B. Lloyd and Rai Bahadur A. C. Mitra have investigated the Wassermann reaction in malaria. Of 85 cases of malaria—proved to be such on blood examination—12 (or 14 per cent.) gave a positive Wassermann reaction. This is well within the normal syphilis incidence rate for an Indian population; there is no evidence that uncomplicated cases of malaria give a positive Wassermann result, and such positive results are in all probability due to syphilis. Capt P. Savage records a most interesting case of spontaneous rupture of a malarial spleen in a British soldier, the lesion being attended by gradually increasing hæmorrhage, gastric

*Notes 1. Unless otherwise mentioned, the commissioned officers referred to are all members of the Indian Medical Service. In order to save space, references to qualifications, appointments, titles, and decorations have been omitted, except in a few instances.

2. Extra copies of this review are available at Re. 1 each from Messrs. Thacker, Spink and Co., P. O. Box 54, Calcutta.

irritation, vomiting, and final syncope of rather sudden onset: there was little or nothing at the time of admission to suggest that the patient was critically ill. J. Dhairyam dwells upon the severe types of cases seen in the Agency Tracts, Madras Presidency—a notorious malarial tract—cases associated with coma, hyperpyrexia, and collapse. He has found intramuscular quinine of value in such cases. The women in this district wear yellow saffron-coloured garments, and as this colour is known to repel the mosquito, they appear to suffer less from malaria than do the men. A local belief is prevalent that cooked onions are of value in warding off malaria. A. Bayley de Castro notes on cases of malaria of hepatic type, and mentions one case of malignant tertian malaria with an enlarged and tender liver and a leucocyte count of 13,000 per cm. M. H. Jhaveri notes on the frequency of cases of gastro-intestinal type amongst police sepoy in Burma, and records five such typical cases. He advocates intramuscular injections of quinine for such patients, as they cannot tolerate quinine by the mouth.

With regard to treatment, priority must be given to Major J. A. Sinton's exhaustive series of papers in the *Indian Journal of Medical Research*, Vol. XIII, pp. 565, 600, 603, 914, and Vol. XIV p. 233. The patients dealt with were Indian prisoners in Lahore jail between June 1922 and February 1923, and July 1923 and February 1924; also British soldiers convalescing from malaria at Kasauli, where reinfections can be excluded. Some 800 cases of malignant tertian malaria were studied. It was concluded that if this infection is treated for one week with 30 grains of quinine daily in solution, combined with Sinton's alkaline treatment, at least 80 per cent.—and probably more—will be sterilised of parasites, (the test for cure being weekly examination of one thick film for 8 weeks). One week's treatment with 30 grains a day in solution of quinine, or cinchona febrifuge combined with alkali will cure about 50 per cent. of such cases. *P. falciparum* infections are much more easily cured than are infections with *P. vivax*. Provocative methods of diagnosis, as by the injection of strychnine or adrenalin, before taking blood films from the patients do not materially improve the percentage of positive findings of parasites in blood films. The occurrence of crescents in the peripheral blood of cases of malignant tertian malaria seems to have a seasonal periodicity and the recorded variations in the incidence of crescent-carriers in different localities is influenced by various factors which are mentioned. (This is in accordance with the observations of other previous workers, that in some localities or seasons the proportion of crescents produced may be very low; in others it may be unduly high). There seems to be a direct correlation between the numerical prevalence of asexual parasites and the number of crescents which appear in the peripheral blood some ten days later. The development of crescents appears to be associated with a lowered immunity of the body, produced by the "toxins" of the disease, and a change in the reaction of the bone marrow or spleen may be a stimulus to the production of crescents. There appears to be no direct correlation between crescent production and the degree of enlargement of the spleen, whilst the duration of life of the crescent in the peripheral blood may be as long as 40 to 50 days, but is more usually less than 21 days after the asexual cycle has been destroyed. The quinine and alkali treatment gives a smaller number of crescent-carriers after treatment than any other form of treatment tried. In cases of benign tertian infection oral administration of short courses of stovarsol did not prevent relapses in the majority of patients. When given by the mouth in doses of 1 gramme daily, it caused *P. vivax* to disappear from the peripheral blood within 48 hours in some 98 per cent. of patients treated. On the other hand it was found that stovarsol may provoke an increased febrile reaction in some cases of chronic benign tertian malaria. A most useful bibliography accompanies Major Sinton's series of articles. Further points in his observations are that he has never had resort to injections of

quinine, having found that vomiting can always be controlled by oral administration of 20 minims of adrenalin solution, repeated if necessary. Also that true quinine resistance was never observed.

The report of the Committee of the Medical Research Council of Great Britain upon the use of the cinchona alkaloids in the treatment of malaria was commented on in our editorial for February, 1926. In general, the enquiry has not yielded results of conclusive value, but it appears to have established the fact that total cinchona alkaloid—if properly prescribed and retained by the patient—is about as efficacious as purified quinine, and far less expensive. Quinidine has grave disadvantages, chief of which are its action on the heart and its cost; but it may be of special value in cases of chronic and relapsing malaria when prescribed in small doses. In brief all the alkaloids in cinchona bark are of value in the treatment of malaria, and financial, economic and other considerations must be taken into account in framing future policy with regard to the cultivation of cinchona.

Major T. A. Hughes reports two cases in which urticaria followed quinine administration. The injection of adrenalin hypodermically prevented the urticaria, but bromides and calcium lactate failed in another case in which there had been generalised urticaria, appearing at the onset of each attack of acute illness and aggravated by quinine. In one instance, adrenalin failed to relieve, but calcium lactate appeared to be of benefit.

J. D. Dundas and D. M. Telang record the absolute and complete failure of mercurochrome-220 in the treatment of cases of malaria. Not only does the drug entirely fail to combat malarial infection—as shewn by temperature records and examinations of the blood—it may also lead to stomatitis, pyalism and renal irritation. R. K. Ithirupad reports good results from the use of daily doses of 6 grains of cinchona febrifuge, combined with iron and arsenic, as an antimalarial measure in a highly malarious plantation in Southern India. The treatment was given for three months before the malaria season set in to all workers on the estate with enlarged spleens, and to the whole labour force during the malaria season.

Lieut.-Col. O. A. R. Berkeley-Hill has tested the value of the treatment by Indian cinchona febrifuge in alkaline solution advocated by Acton and Knowles on patients at the European Mental Hospital, Ranchi. Such patients were kept under subsequent follow-up observation for periods of six months or longer, whilst the chances of natural re-infection at Ranchi are but slight, as it is at an altitude of about 2,000 feet above sea level. Under such circumstances 43 patients suffering from benign tertian malaria—verified as such by microscopical examination of the blood—were treated for one month by the standard treatment with Indian cinchona febrifuge in alkaline solution suggested by these authors. Of them 6 relapsed, or 14 per cent.—a relapse rate which is certainly much lower than that obtained in general hospital practice in India. Some patients, however, cannot stand cinchona febrifuge, however it may be prescribed.

J. Dhairyam and M. R. Jhaveri advocate the use of intramuscular injections of quinine for cases of malaria with vomiting, gastro-intestinal symptoms, or in cerebral malaria: the latter claims to have given many intramuscular treatments without bad effects of any kind, and suggests that faulty aseptic technique is the cause of all the troubles that arise with this method. (It would be of interest if the subsequent history of these patients could be traced three to four months later, since the necrosis due to intramuscular injections of quinine may not make its effects felt until two to three months after the course of injections.)

A very important paper on the epidemiology of malaria, as studied by inoculations of malaria by infected mosquitoes in cases of general paralysis of the insane is that by Lieut.-Col. S. P. James, I.M.S. (retd.), reviewed in our editorial for September, 1926. He deals with the symptomatology of primary benign tertian malaria as thus induced—a disease quite unlike relapsing benign

tertian malaria as usually seen in hospital practice in India; and with the biological factors concerned in mosquito transmission of malaria. In artificially produced malaria, short courses of quinine are usually sufficient to sterilise the patient of parasites—an experience directly contrary to that in tropical practice. It may be suggested, on the strength of this paper, that our malarial patients may be cured by short three-day courses of treatment; repeated should a relapse occur. The work and observations of Major Sinton, however, are more directly applicable to actual conditions as they occur in India; and few workers in this country will concur in advocating anything less than a two to three-weeks' continuous administration of the cinchona alkaloids for patients with malaria.

Turning to *blackwater fever*, two papers merit attention. Dr. U. N. Brahmachari records the case of a patient who first suffered from malaria and then from kala-azar. The hæmoglobinuria was of an intermittent character and most active when fever was present; it was always precipitated by taking quinine, and blood drawn from the liver during the attack of hæmoglobinuria showed distinct signs of hæmolysis. S. M. Roy records treatment of a severe case of blackwater fever from the Dooars: being convinced that the condition was essentially due to malaria he treated the patient by intramuscular injections of quinine and intraperitoneal injections of normal horse serum. The patient made a complete recovery. The case is of interest in that the patient was an Indian male adult, an immigrant some years previously into the district concerned.

Plague.

The most important work of the year has been the commencement of an experimental enquiry at the Haffkine Institute, Bombay by Dr. B. P. B. Naidu, Capt. R. H. Malone and Khan Bahadur C. R. Avari into the possibility of improving Haffkine's vaccine. In this connection we have received a special report from Colonel Mackie which is rather too long for inclusion in this review, but which we hope to publish in our next month's issue, as it is of great interest. As a test virus for immunised rats they advocate 0.003 mgm. of the spleen of a rat which has died of acute plague. A prophylactic dose of 0.5 c.c. of the vaccine gives an average mortality of 23.3 per cent. in rats and confers immunity on 33.9 per cent. Supernatant fluid from centrifuged anti-plague vaccine was found to contain the immunising principles, the sediment conferring only a slight degree of immunity. Each brew of vaccine must be separately tested, because, for reasons not yet understood, an occasional brew may fall far below the standard. The vaccine is at its maximum potency between the 5th and 16th weeks of storage, but it retains good immunising properties for a year. Fresh brews of vaccine are very toxic to rats and produce severe reactions in man. The potency of the vaccine appears to depend on the virulence of the strain of *B. pestis* used, and this can be raised by repeated passage through rats. In further papers Dr. Naidu and Jemadar Shamsher Jang shew that anti-plague vaccines sensitised by immune sera have no advantage over non-sensitised vaccines, and that treatment of experimentally induced plague in laboratory animals by mercurochrome-220 is entirely unsuccessful. Professor F. M. Marras, Director of the Quarantine Bacteriological Laboratory, Port Said, has been on a visit to India in connection with maritime anti-plague measures, and has also been conducting experiments at the Haffkine Institute. In the case of dead and putrid rats, he shows that the thermo-precipitin reaction can be applied to their tissues; if a positive result is obtained, it is certain that the rat died of plague, but a negative result is inconclusive. A rapid method for the identification of the plague bacillus by inoculating tubes of glucose and saccharose media, with and without the addition of anti-plague serum, is also given. Dr. D. A. Turkhud on speculative grounds advocates the treatment of plague by intravenous injection of 100 c.c. of a 15 per cent. hypertonic salt solution; this measure should reduce cerebral and hepatic congestion, flush the

kidneys and combat toxæmia. The injections should be given once or twice a day at 100°F., depending on the condition of the patient. A. C. Bharadwaj claims that 80 per cent. of plague cases can be cured by intravenous injections of iodine: his solution is iodine, 18 grains, potassium iodide, 36 grains, in 4 ozs. of distilled water. He gives 5 c.c. to 10 c.c. of this in one dose daily for four or five days, the patient receiving from $\frac{1}{4}$ to $1\frac{1}{2}$ gr. of iodine daily. Local injections of carbolic acid or of perchloride of mercury, gr. $1\frac{1}{16}$ th in 2 c.c. of distilled water, into the lymphatic area draining the group of glands in which the bubo has formed are also recommended.

Cholera.

The year has seen a big output of papers dealing with the epidemiology of cholera in India. In the first place comes a series of papers by Major (now Lieut-Col.) A. J. H. Russell, Director of Public Health, Madras, assisted by Mr. E. R. Sundararajan, M.A., an expert mathematician and statistician. Colonel Russell summarises his findings as follows:—

Investigations in connection with cholera have again received considerable attention. The Indian Research Fund Association sanctioned the employment of a Statistical Assistant for a second year, and, with his help, the work commenced in 1924 has been continued. The first paper published during the present year dealt with the correlation of cholera and climatic factors for the provinces of Bengal and Assam, omitted from a previous paper dealing with the other provinces of India. It was shown that while the six-yearly periodicity existed over the western and deltaic areas of Bengal, for all those areas lying to the east of the river Ganges, a sixty-month periodicity was most probable. This difference makes one ask the question if these latter areas may not be the most intimately concerned with the origin and spread of the cholera waves which travel westwards and to the south.

The second paper of the year described a short and simple method for the construction and reduction of correlation tables, which had been found extremely useful in preparing the large number of correlation tables required in the statistical investigations.

The partial correlation coefficients for M_1 (Northern Districts Group of Madras Presidency) and for B_1 (the Burdwan Division of the Bengal Presidency) were presented in another paper, but although various tentative inferences were drawn from the results obtained for these two areas, final conclusions were postponed until similar calculations for the other Groups and Provinces were made. These are now well under way and it is hoped to give the final results early in 1927.

Making use of a method described by Bundesen and Hedrich, it has been found possible to make forecasts of epidemics 2 to 3 months before their commencement, and it seems probable that this epidemic index will give public health workers an additional and useful weapon in their fight against cholera in this country. A paper describing the method and giving the results obtained will, it is hoped, be published very shortly.

The geographical survey of the Presidency in connection with cholera was undertaken towards the end of last year, but, owing to unforeseen circumstances, the officer who commenced this piece of work had to give it up and for several months nothing could be done. Another officer was obtained only in July and, whilst most of the information required has now been collated and analysed, the final report is not yet ready.

The field investigations planned to test the value of anti-cholera vaccine and of cholera bili-vaccine, and commenced late in December 1925, were carried on during the winter epidemic of January and February 1926. Although the cholera infection never completely died out, the cases were so sporadic that it was thought advisable to discontinue the tests until the epidemic rise of July and August commenced. Since then a large number of persons in infected areas have been treated, but of course results cannot yet be given for these. It may be said, however, that the preliminary analysis of the records of

persons treated in the earlier months of the year indicates that the anti-cholera vaccine is a very valuable prophylactic. As regards the bili-vaccine whilst the numbers available are perhaps still too small; so far as they go, they indicate that Besredka's bili-vaccine gives a high protection for at least three months after it has been taken. The figures up to the end of June 1926 have been dealt with in a "Preliminary Note" on the subject which is to be presented by Col. Graham, I.M.S., at the January 1927 meeting of the League of Nations' Far Eastern Bureau in Singapore.

An attempt has also been made to obtain information, suitable for statistical analysis, regarding the value of certain methods of treatment of cholera cases, e.g., with *Mist. pro diarrhoea* (an essential oils preparation), with *Mist. pro diarrhoea plus permanganate pills*, with permanganate pills alone and with kaolin. About 1,000 cases have so far been collected but it has been found extremely difficult either to make a definite classification of the cases, or to estimate the value of the results. There is some reason to believe that the *Mistura pro diarrhoea* with or without permanganate pills is of considerable value when the disease has not progressed too far. Meantime, it is not possible to make a more definite statement.

The experience of the past year has shown how difficult it is to carry out field investigations of this kind. Many of the cases recorded by the Sub-Assistant Surgeons in the field have been necessarily rejected, either because they failed to satisfy the statistical requirements for such materials, or because the Sub-Assistant Surgeons had not carried out the definite instructions given. Moreover, every person treated with vaccine has to be re-visited several months later in order to obtain his history subsequent to immunisation, and it has not always been found to be possible to get such information."

Sir Leonard Rogers deals with the association of meteorological factors with the spread of epidemic cholera, a paper abstracted in our issue for last September, and also the subject of the editorial in our issue for last month. There is no uniform relationship between cholera incidence and rainfall, but there is a regular decline or disappearance of the disease in all parts of India when the absolute humidity falls to or below 0.400, such dryness of the atmosphere preventing the epidemic prevalence of the disease. The months in which cholera showed a great increase after the winter quiescence in North-West and Central India are those in which the absolute humidity first rose to over 0.400, the seasonal increase in the epidemic areas being quite independent of any spread from Bengal.

Lieutenant-Colonel C. A. Gill deals with cholera in the Punjab in 1925. Cholera appears in the Punjab at irregular periods which usually recur about once in every twenty years. The sequence of events is in all cases almost exactly the same; cholera becomes abnormally prevalent one year in Bengal, late in the same year Kashmir is infected—the "northern epidemic highway" of Bryden,—it persists in Kashmir throughout the winter, and invades the Punjab in the following spring. It is thus possible to anticipate events and to take measures beforehand. From the Punjab the spring migration of Afghan *powindahs* back to Afghanistan may lead to widespread infection of Central Asia, and thence to Russia and Europe. Once the stage is set, the drama follows. On the other hand it is now very doubtful whether world-wide cholera can in every instance be traced to an origin in Bengal; there appear to be other endemic foci in India, possibly also elsewhere.

Major G. G. Jolly deals with cholera and the reaction of river waters. It was noted by Lieut.-Col. W. C. Ross and K. N. Bagchi that the water of the Ganges changes from an alkaline to an acid reaction about April, and changes back to an alkaline reaction about October. Stitt puts the pH limits for growths of *Vibrio cholera*

as from 6.4 to 7.9, with an optimum between 7.0 and 7.4. Ganges water will therefore have a pH favourable to growth of the cholera vibrio at or about Ross and Bagchi's neutral points, which coincide more or less closely with the two cholera waves a year which occur in this area. W. J. Marshall deals with cholera at Goalundo ghat, the centre of the Bengal-Assam riverine traffic. An epidemic in September, 1925 was traced to importation of infection by fishermen compelled by a storm to take refuge at the ghat. R. B. Lal and M. Jacob deal with the relative suitability of different foodstuffs as culture media for the cholera vibrio, finding that articles containing salt and animal or vegetable proteins, such as meats and cooked *dal*, are especially suitable; chillies and onions—contrary to popular belief—do not inhibit the growth of the vibrio; fats form poor culture media, whilst sour articles are inhibitory.

Several articles have appeared by Dr. J. W. Tomb and Capt. G. C. Maitra on the subject of agglutinable and non-agglutinable vibrios, and their respective relationship to epidemic cholera. Dr. Tomb, in summarising this work, writes as follows:—

"Tomb and Maitra describe a new method of isolating and cultivating vibrios from cholera stools of special value in field work. The method is based on the observation that during the hot dry weather in Bengal vibrios are found to grow abundantly in the water of ground tanks commonly used by the people for washing after defaecation.

The method briefly is as follows:—

Small samples of the cholera stools to be tested are inoculated by means of twigs or pieces of dry stick into test tubes containing 1 per cent. ordinary saline.

On arrival of the samples at the laboratory or after 2 to 6 hours incubation in the test tubes at room temperature, the fluid contents of the tubes are transferred to open enamelled bowls of 500 c.c. capacity, each containing about 250 c.c. of 1 per cent. saline together with a few c.c. of a 1 per cent. solution of peptone.

The bowls are then incubated in closed lockers at room temperature up to five or six days, a few loopfuls of the surface layer in each bowl being tested daily for the presence or absence of vibrios through ordinary peptone medium and plating out on bile-salt agar plates. The authors claim that this method surpasses all existing methods in accuracy and cheapness, the saving in the cost of peptone alone being very considerable.

In a second paper on "Agglutinating and non-agglutinating Vibrios found in the human intestine and in Water, and the relationship between them," these authors report that in the endemic area of the Asansol Mining Settlement at least 30 per cent. of the inhabitants are chronic carriers of non-agglutinating vibrios. The method used by them for the detection of chronic carriers (which is a modification of that described above) being as follows:—

Each whole stool is emulsified in about 400 c.c. of 1 per cent. saline and then allowed to settle for six hours in a conical glass; 40 to 50 c.c. of the supernatant fluid are then poured off into open bowls each containing 200 c.c. of 1 per cent. saline and a few c.c. of 1 per cent. peptone solution.

In the same paper these authors have drawn the conclusion that the agglutinating or Koch's vibrio is the epidemic or mutation form of the non-agglutinating vibrio, the latter constituting the reservoir of epidemic cholera. The grounds on which they have drawn this conclusion are briefly these:—

(a) Non-agglutinating vibrios are themselves capable of causing cholera, being found associated very constantly with sporadic cholera, a disease in every respect clinically identical with epidemic cholera.

(b) Extended examinations of the stools of epidemic cholera convalescents showed that at least 30 per cent.* of these convalescents became chronic carriers of non-agglutinating vibrios, the agglutinating form permanently disappearing from the stools within two weeks in most cases, and in all cases within four weeks.

(c) Healthy contacts of cases of Koch's infection also habitually became free of infection within two to four weeks, or became chronic carriers of non-agglutinating vibrios.

(d) Stools of epidemic cholera cases containing large numbers of Koch's vibrios when introduced into the water of ordinary ground tanks showed a rapid change of Koch's form into the non-agglutinating form (within 12 to 14 hours).

(e) Laboratory cultures of Koch's vibrios similarly introduced into ground tanks also lost their agglutinability within 24 to 36 hours.

(f) No chronic carrier of Koch's vibrio was found after extended search in the Asansol Mining Settlement and no such carrier has been found elsewhere by any other observers.

(g) Chronic carriers of non-agglutinating vibrios on the other hand are very numerous, at least 30 per cent. of the inhabitants of the Asansol Mining Settlement as mentioned above being carriers of non-agglutinating vibrios.

(h) Spontaneous outbreaks of epidemic cholera (Koch's) have been frequently observed in the Asansol Mining Settlement, several such outbreaks having occurred during the course of the investigation reported on by Tomb and Maitra.

(i) It has also been frequently noted in countries where cholera occurs in epidemic form, that during epidemics (due to Koch's vibrio) non-agglutinating vibrios appear in great numbers in contaminated water supplies (sewers, etc.), these non-agglutinating vibrios disappearing *pari passu* with the disappearance of the epidemic.

Tomb and Maitra therefore infer that the non-agglutinating vibrio in the human intestine (which is itself capable of causing the symptom-complex known as cholera) under certain favourable conditions at present unknown takes on the "agglutinating" characteristic and in this mutation form is the cause of epidemic cholera, epidemics being spread by the pollution of drinking water and by contact."

K. L. B. Mallik insists on the great value of Rogers' hypertonic saline treatment, and claims that it still stands as the best method. The total death-rate amongst 100 cases so treated was 17 per cent. and all the deaths occurred among a group of 67 patients admitted in a collapsed state. S. R. Bharti compares different methods of treatment, but the numbers dealt with are not sufficient upon which to base conclusions.

Dysentery, Enteric Fevers, Sprue, Etc.

An important paper is that by Major J. A. Manifold, V.S.O., R.A.M.C., in the *Journal of that Corps* for February, abstracted in our issue for last July, p. 358. He shows that the well-known "Poona diarrhoea" is usually due to infection with Flexner's bacillus; that amoebic dysentery is far less common than bacillary in India; that macrophages in a bacillary dysenteric stool are frequently mistaken by laboratory workers for the vegetative form of *E. histolytica*; and that methods of diagnosis require to be vastly improved. Useful instructions are given for methods of sending faecal specimens to labo-

ratories, including the point that stools emulsified in 30 per cent. neutral glycerine in 0.6 per cent. saline give a better chance of isolating dysentery bacilli in a stale specimen than does simple emulsion in normal saline.

Major G. Shanks records a case of fatal amoebic abscess of the lung without macroscopic involvement of the liver. M. Khan and Dr. V. S. Hodson advocate emetine without aspiration for cases of liver abscess; the pus in an amoebic abscess is sterile unless secondary sepsis has occurred, and once the amoebae have been killed off by emetine the pus is absorbed, just as is the pus in a cold tubercular abscess. V. N. Deuskar advocates the administration of emetine intravenously in cases of amoebic dysentery, together with Deeks' bismuth treatment. Over 1,000 such injections were given in connection with 70 cases without any harmful effects being noted, the treatment consisting of 1 grain intravenously daily for 9 days, followed by an interval of rest of 6 days, then a second course of 1 grain daily for 6 days. Only 6 cases showed a dysenteric relapse during a period of observation of some months. He expresses no views as to the advantage of intravenous injections over subcutaneous from the point of view of efficacy. It is important that there should be definite evidence of superior efficacy for intravenous injections, since the method would otherwise have no advantage over the easier and safer methods.

B. D. Pal cites four cases of paresis following after emetine injections, including one severe case in a patient who had had 6 grains. Major R. Knowles in an editorial in this journal discusses the treatment of amoebic dysentery, which he describes at present as being "in a confused state." He pleads for carefully controlled tests in army hospitals, jails, etc., where the patients can be followed up, and after-treatment examinations of stools carried out. He believes that emetine is still the sheet-anchor of treatment, but that an adjuvant may improve results.

Lieut.-Col. Sir Thomas Carey Evans (*Trans. Roy. Soc. Trop. Med. & Hyg.*, Vol. 19, p. 282) deals with the surgical aspects of amoebiasis. Amoebic typhilitis can be distinguished from ordinary appendicitis, partly by stool examination and partly by the history. The proper treatment is by emetine, and not by surgical operation which gives bad results. He calls attention to localised thickenings of the large intestine due to amoebic infection. If these do not yield to emetine, the patients should be operated on in all cases where symptoms of partial obstruction exist. Though actual stricture of the bowel is rare after amoebic dysentery, there may be cases of partial stricture due to cicatrix formation, and these may be responsible for bowel derangements. Spasm of the bowel is also likely to occur.

S. K. Mukherji (*Indian Med. Record*, May, p. 135) contributes a useful paper on the diagnosis and treatment of bacillary dysentery—a paper which should go far to correct the prevalent and erroneous view that amoebic dysentery is far more prevalent in India than bacillary dysentery. V. J. Lopez gives a most interesting account of epidemic acute gastro-enteritis—i.e., acute infection with Shiga's bacillus—amongst Moplah prisoners in Alipuram Jail, Bellary. That this condition was due to Shiga's bacillus was proved by a mobile bacteriological unit from the King Institute of Preventive Medicine which was sent to Bellary to study the outbreak. The Moplah prisoners concerned arrived in a very poor state of health, and the great climatic variation at Bellary between hot days and cold nights during the winter months may have been a predisposing cause. The food supply is most carefully controlled and regular "bowel control" in force. In treatment Rogers' hypertonic saline method is invaluable, milk should be withheld during the acute stage, albumin water, etc., being substituted; glucose and adrenalin may be added to the intravenous saline, whilst $\frac{1}{10}$ grain doses of cocaine orally are of value in checking vomiting.

* Since found to be 80 per cent.—ED., I.M.G.

Capt. G. C. Maitra and J. B. Basu have tested the results of prophylactic immunisation against bacillary dysentery by Besredka's oral "bilyaccins" on jail populations. Of 627 prisoners immunised orally by a locally prepared vaccine, 18 or 2.88 per cent. subsequently contracted dysentery; the incidence among 4,516 controls being 5.2 per cent. Of 509 treated with standard "bilyaccin," 11 or 2.16 per cent. subsequently contracted dysentery as against 4.46 per cent. of 1,053 controls.

Turning to enteric fever, P. C. Chakravarty has studied the use of Marris' atropine test in the wards of the Medical College, Calcutta. Of 22 cases—bacteriologically proved to be positive—20 gave a positive Marris' test. The method is of great value in clinical medicine when laboratory facilities are not available. Major M. L. Treston also bears witness to the value of Marris' test; it was positive in 56 out of 73 cases of enteric fever tested, but was of far more value in infections with *B. typhosus* than in paratyphoid fevers. The test may also be positive in dengue. The same author advocates the treatment of cases of enteric fever with T. A. B. vaccine, given in doses rising from 2 minims to 10 minims on alternate days; it curtails pyrexia, limits toxemia, and prevents complications; it may be given at any stage of the disease.

With regard to *sprue* an important enquiry has been conducted at the Haffkine Institute, Bombay by Dr. N. Hamilton Fairley, Lieut.-Col. F. P. Mackie, assisted by Dr. Chitré and others. The cultural and other characters of *Monilia ashfordi* are given, and the results of a study of the aerobic intestinal bacilli in *sprue* cases. This *Monilia* is apparently a secondary rather than a primary infection. A very good clinical account of *sprue*, its complications and aberrant cases is given. (*Indian Jour. Med. Res.*, Oct. pp. 105-128). Diagnosis should not be delayed until the characteristic stools appear. Recurrent apyrexial diarrhoea, not associated with the presence of mucus and blood in the stools, should always be regarded as being the early stage of *sprue*, at any rate in the European and Anglo-Indian populations in endemic areas. Prolonged residence in endemic areas, and preceding malaria or dysentery, are the chief predisposing factors. Diet is considered to be the essential in treatment; whilst calcium lactate and parathyroid treatment did not appear to give better results than those obtained by dieting alone.

Kala-Azar.

Dr. L. E. Napier, Kala-azar Research Worker, Calcutta School of Tropical Medicine, reviews the year as follows:—

The kala-azar transmission problem.—The Kala-azar Commission in Assam and the Kala-azar Inquiry at the Calcutta School of Tropical Medicine have continued their work on this problem throughout the year. During the year the long delayed *Kala-azar Memoir* of the *Indian Journal of Medical Research* was published; most of the papers in this memoir were submitted for publication early in 1925 and were reviewed in last year's *Indian Medical Year*. Both these inquiries have carried out a large number of experiments, attempting to infect animals by the bite of infected sandflies, *P. argentipes*, but the experiments have been up to the present proved uniformly negative.

Further papers have been contributed by the Commission showing that the *Leishmania* infection in the sandfly always progresses forwards towards the mouth-parts of the fly, and massive infection of both the pharynx and the buccal cavity have been demonstrated. Perhaps the most important paper that has been published during the year was that reporting the finding in nature of a sandfly, *P. argentipes*, infected with a flagellate morphologically identical with *Leishmania donovani* in connection with an outbreak of kala-azar.

The Commission have published a paper on the methods employed in feeding sandflies for a second and third

time on man and experimental animals, and have given further details about the breeding of sandflies in the laboratory; they emphasise the importance of the maintenance of a steady temperature of 28°C. throughout the whole life-cycle of the fly. They also contributed an important paper on the life history and morphology of *Herpetomonas donovani* (*Leishmania donovani*) in the sandfly, *P. argentipes*, in which they demonstrated all the stages of the parasite that had previously been described as occurring in artificial medium, with the exception of the (?) cystic stage. From the behaviour of the parasite in the fly and from the fact that infection progresses towards the mouth-parts they conclude that the infection cannot pass directly to the next generation of fly and that an intermediate host is necessary to complete the life-cycle of the parasite.

The Commission carried out a series of experiments with *Conorhinus rubrofasciatus* and confirmed the findings of other workers that development of the parasite of kala-azar does not take place in this insect.

Epidemiology.—Drs. Turkhud, Krishnan and Iyer investigated kala-azar in the Ramnad district in Southern India. They were able to find specimens of *Phlebotomus argentipes* in most of the places where kala-azar was prevalent, but their general conclusions tended to suggest that the possibility of oral infection should not be overlooked altogether.

Drs. Guruswami Mudaliar, Raman and Raman Menon reported a case in which the patient developed kala-azar after nine months' residence in Bombay; the patient had previously lived at Calicut; whilst B. J. Bouché reported a case from the Simla Hills; this patient had lived in Madras 8 years previously.

A. C. Chatterjee in a paper on the infectiousness of kala-azar and its control concluded, although his conclusions were not always supported by evidence, that kala-azar was not contagious, that it was infectious because the patients infected the site, that it was less infectious in the early stage of the disease, that segregation and isolation were not practical methods, but that early treatment was the best method of preventing the spread of the infection.

Clinical.—Captain G. Shanks and G. P. Khan in an interesting paper on the diagnosis of typhoid-like fevers in Bengal showed that true typhoid was followed by kala-azar in a number of cases, whereas in others the onset of kala-azar simulated typhoid. They found that when a typhoid patient contracted kala-azar the agglutination reaction to typhoid was rapidly lost.

Treatment.—In a series of 104 cases of kala-azar treated by Stibosan Dr. L. E. Napier reports 11 deaths during the course of treatment. In 7 out of 77 of the cases that were followed up a relapse occurred. He estimated that from the point of view of economy in material the optimum total dose was 3.5 grammes per 100 lbs. body weight of patient, that after this dose one might expect a 9 per cent. relapse rate and that if the relapsing cases were then given a 6 grammes course of treatment the final relapse rate could be reduced to 2 per cent. He found no evidence to suggest that certain patients become antimony-fast.

In the *Annual Report of the Calcutta School of Tropical Medicine* for 1926 the same writer reports 8 deaths amongst 157 patients treated by one or other of the pentavalent compounds of antimony, and 11 deaths amongst 46 persons treated by either sodium antimony tartrate or another trivalent compound of antimony; amongst the pentavalent compounds which he used were Stibosan, Urea-stibamine, Amino-stiburea and von Heyden No. 693; with the last named no deaths have occurred and a very high cure rate has been attained.

In a short note on the treatment of kala-azar by Urea-stibamine Napier recorded excellent results in a

series of 36 cases in which the patients received an average total dose of 3.15 grammes per 100 lbs. body weight.

A. C. Chatterjee reported a series of 18 cases in which he used Urea-stibamine; there were 5 deaths amongst this series.

Dr. U. N. Brahmachari and Judhistir Das added a further contribution to their series of papers on the chemotherapy of antimonial compounds in kala-azar; they give certain details of the glucose compound of antimony and the condensation of dichloro-acetamide with the above acid.

Dr. Brahmachari and B. B. Maity showed that Urea-stibamine does not increase in toxicity when stored for a number of years and that old samples of the compound are equally efficacious in the treatment of kala-azar.

Major R. N. Chopra investigated the pharmacological action of certain organic compounds of antimony. The preparations investigated were Stibosan, Urea-stibamine, (both the Stiburia brand and the original preparations), Aminostiburea and Novostiburea, and cats were used as experimental animals. He found that they all have a more or less depressing effect on the heart, circulation and respiration. The systemic blood pressure rises and pulmonary blood pressure falls. Another interesting observation was that there is always a marked increase in spleen volume.

A number of cases were reported in which anaphylactic-like symptoms followed the injections of one of the pentavalent compounds of antimony. The symptoms seldom followed the first injection but appeared later in the course of treatment; there did not seem to be any association with the amount of drug given, as in some instances an injection caused the most violent symptoms when the same dose had previously caused no symptoms in the same patient. The symptoms varied from a tingling sensation and a mild urticarial rash to a severe urticarial rash all over the body, oedema of the glottis necessitating tracheotomy, and unconsciousness. No deaths were reported. The symptoms usually disappeared rapidly; the subcutaneous administration of adrenalin appeared to accelerate recovery. Napier collected and reported a number of such cases occurring after the administration of various antimony compounds. N. Chatterjee reported a severe case occurring after Aminostiburea and T. P. Sen Gupta one after Urea-stibamine.

Leprosy.

Dr. E. Muir, Leprosy Research Worker, Calcutta School of Tropical Medicine, writes as follows:—

"Progress in a disease like leprosy must necessarily be slow.

One advance has been made in recent years. It has been realised that leprosy is remediable; that when early diagnosis is made and early and efficient treatment persisted with, almost all patients improve.

While a cure in the strictest sense of the word is not claimed any more than it is claimed in tuberculosis, the patient may look forward to the future with confidence knowing that if he obeys certain rules of life and keeps good general health he is not likely to see any more of this dread disease.

As the result of the formation of the Indian Branch of the British Empire Leprosy Relief Association, definite steps for ridding India of this plague are being taken. Some 19 lakhs of rupees have been raised. This has been funded, half the interest is being spent in research, training of doctors and in preparing literature, slides and charts for propaganda.

During the year some 60 doctors have been sent by various provincial governments and native states for

special courses of training in Calcutta. Assam, one of the more highly endemic provinces, is taking up a campaign of leprosy in real earnest and has begun a systematic survey of the disease. From this province some 16 doctors have been sent for training during 1926 and a similar number will be sent until there is an expert in the disease in every sub-division of Assam. Other provinces are appointing wholtime experts to organise leprosy campaigns.

There has been a tendency among medical men to consider that, because a specific has not yet been discovered for leprosy which will by its administration cure the majority of cases, nothing can be done to deal with this scourge. This feeling of despair is now disappearing as it is being realised that we have means at our disposal for dealing effectively with leprosy. Once the medical profession has fully grasped this point and, once medical men are fully acquainted with the nature of the disease and what can be done for it, leprosy may be expected to rapidly diminish in its frequency.

What is of first importance is that a census of the endemicity of leprosy, carried out by trained doctors, be made all over India. This does not imply an attempt to enumerate all those who are infected with this disease. But typical areas should be chosen, places of highest infection being selected on the basis of the general census of 1921 and compared with neighbouring parts with lesser infection, so as to find out both the actual numbers of those suffering from the disease in these places and the causes which make for high endemicity. It is likely that such a survey, if thoroughly and widely enough carried out, will give important data which will point the way towards effective preventive methods.

With regard to treatment, Lieut.-Col. R. Row of Bombay has prepared a vaccine by the autolysis of tubercle bacilli which in his hands gives promising results.

Recent work carried out by Lloyd and Muir has shown the frequency of the association of syphilis with leprosy and the importance of dealing with the former disease if the latter is to be remedied.

Experiments carried out by Muir have shown the value in syphilis combined with leprosy of a large molecule mercury preparation first prepared as Hg. 33 by Dr. Henry of the Burroughs, Wellcome Bureau of Scientific Research and now sold under the proprietary name of "Avenyl" by Messrs. Burroughs, Wellcome & Co.

An article by Muir on external applications in leprosy details the value of certain caustics and surgical procedures in dealing with leprosy, and another article by the same author shows up certain fallacies into which those who attempt to estimate the value of a line of treatment by testing it on only a few cases are apt to fall.

A special "Leprosy Number" of the *Indian Medical Record* appeared in November 1926. In this, an important contribution to the pathology of leprosy is given by Wade. Discussing the site of the lepra bacilli in the body and the divergence of opinion between Unna and Virchow as to whether the bacilli lie in the lymphatics or in the large mononuclear, wandering cells, he holds the view that the bacilli are predominantly in the cells but can also be scattered through the body in intercellular spaces and capillaries. He also emphasises the importance of the lymph glands as reservoirs in latent forms of the disease, and refers to the work of French colonial doctors who obtained bacilli by gland puncture in cases otherwise bacteriologically negative. Dr. S. K. Mukherji gives his experience in ocular leprosy and Dr. Gupta in ionic medication by which improvement in sensation and return of pigment have been obtained. An article by Dr. Neve emphasises the importance of trying to save children from the infection. He mentions the frequency of eye

complications in Cashmere. Dr. Bhaduri describes three cases of leprosy of the eye. Two interesting accounts of the Ayurvedic teaching with regard to leprosy are given. A 'review of the present state of our knowledge of leprosy' is given, as are various other reviews and short articles on the subject."

With regard to Dr. Muir's article on external applications in leprosy, trichloroacetic acid is recommended in strengths of from 1:1 to 1:5; the weakest solutions are used on the face, whilst the medium strength is best for all round use. The paper should be read in the original for details of the method (*Indian Med. Gaz.*, May, p. 215). He also advocates the excision of early nodules under local anaesthesia. Dr. Muir also calls attention to the fallacies which exist in estimating the value of drugs in the treatment of leprosy. The reactionary stages of leprosy are frequently not recognised; a patient often consults his doctor because his lesions become more conspicuous; apart altogether from treatment this exacerbation usually passes off, and the improvement is then likely to be attributed to the medicament used. If syphilis and leprosy co-exist in the same patient, even an effective drug against the latter will fail until anti-syphilitic treatment has been carried out. Any drug which causes inflammatory reactions in the granulomatous lesions is likely to cause improvement; hence the number of drugs which have been found to have a temporary beneficial effect. No treatment can affect the permanent scars or other permanent lesions of the body.

Dr. R. G. Cochrane lays stress on enlargement of a single nerve in the diagnosis of leprosy, and gives three illustrative cases: one of severe enlargement of the ulnar nerve, associated with abscess formation; a second of marked enlargement of the ulnar nerve with anaesthesia of the forearm as the only lesions present; a third where swelling in the neck, due to enlargement of the great auricular nerve, and a raised erythematous patch over the right eyebrow were the only lesions present. The true diagnosis in such cases is easily missed.

Pulmonary Tuberculosis.

That increasing attention is being paid to the terrible problem of pulmonary tuberculosis in India is evident from the considerable number of papers published in connection with it during the year. Dr. E. Muir deals with the problem as it affects Bengal. Pulmonary tuberculosis in India is essentially a disease of towns, and not of the rural country-side. The chief factors concerned in its spread are bad housing, indiscriminate spitting, poverty, under-feeding, early marriage, and the purdah system. In 1924 there were 5,577 deaths recorded in Calcutta from pulmonary tuberculosis, and this figure is probably well below the mark; yet nothing is being done about it. Leprosy—to which so much attention is being paid—is a relatively insignificant problem in India as compared to tuberculosis. A. C. Ukil deals with a different aspect of the same problem. He found the von Pirquet reaction negative in all children examined up to the age of 5 years in Calcutta, but from that age onwards there is an increasing percentage of positive reactions, Bengalis of age 50 and upwards giving 66 per cent. of positive reactions. Of 212 cases examined, bovine strains were responsible for only 3, all the others being due to infection with human strains. Lung tuberculosis is very uncommon among Indian children under the age of 5 years, but in later life the combination of unsuitable diet, lack of sunlight, fresh air, and exercise, the occurrence of debilitating diseases, and almost universal exposure to infection render the Bengali an easy victim to tuberculosis. The obverse of this picture is shown by the work in Bombay of Dr. M. B. Soparkar who shows the relative insusceptibility of Indian calves, and even of cross-breeds between Indian and European cattle, to experimental infection with bovine tuberculosis; this being in complete contrast to the great suscep-

bility of English cattle as shown by the Royal Commission on Tuberculosis. It is sufficiently obvious that the tuberculosis problem of the tropics is an entirely different one from that in Europe, and that tuberculosis is one of the most important tropical diseases.

R. Krishna advocates exercising common-sense in the selection of patients to be sent to hill sanatoria; (*Indian Med. Gaz.*, August, p. 389). We hope that the medical profession in this country will take his remarks to heart. Nothing could be worse than to send a poverty-stricken patient, ill-clad, suffering from extensive disease in both lungs and with high fever to a cold climate, the rigours of which he is unable to withstand.

The sanocrysin treatment is on trial in India, and papers dealing with its results have been published by Lieut.-Col. C. A. Sprawson and Dr. Frimodt-Møller. "To sum up" writes Colonel Sprawson, "I think that in sanocrysin we have another valuable weapon in fighting pulmonary tuberculosis. It stands to reason that the drug must be used intelligently and only in cases selected for this treatment, and the x-ray appearances will be a help in this..... The physician should not undertake the use of sanocrysin until he has read of or seen something of its use, and understands the possible dangers that may arise and how to combat them." Y. G. Shrikhande, from the King Edward VII Sanatorium, Bhowali, contributes a most interesting paper on the artificial pneumothorax treatment of pulmonary tuberculosis as applied to Indian patients. This method must be applied to selected cases only, the chief contra-indication being extensive disease in the other lung. But taken all round, it is a form of treatment especially well adapted for use in India. It does not necessitate a change to the hills; "even if the results are not permanent, the prolongation of life, increased comfort and well-being, and return to power to work entitle this mode of treatment to a high place in the treatment of consumption. Indeed, if nothing else, pneumothorax treatment can bring back those who were otherwise labelled as 'hopeless' to a life of comfortable existence. The striking success of the treatment impresses itself on those who practice it." Yet in how many centres in India can artificial pneumothorax treatment be obtained for the thousands of cases of pulmonary tuberculosis all over India? V. J. Lopez is a strong advocate of intravenous iodine injections in pulmonary tuberculosis, ($\frac{1}{2}$ to 1 grain with potassium iodide in 10 c.c. of water every fourth day for six doses); and records that of 33 such cases under close observation for months in Alipuram jail, 26 are to all intents and purposes cured, and have put on from 15 to 35 lbs. in weight.

Diabetes.

Special diabetes numbers were published in the *Calcutta Medical Journal* in January and February. Dr. J. P. Bose points out that 80 per cent. of cases of diabetes in Calcutta are preceded by obesity. Stout Indians usually show a diminished sugar tolerance when tested by the glucose tolerance test. He does not think that excessive carbohydrate diet in itself is of importance, but rather that over-eating in general and lack of exercise are the essential predisposing factors. The disease is much less common in females in Calcutta. It is the rich classes who over-eat and take too little exercise that suffer chiefly. Worry and strain are also believed to be factors, also possibly other infections. U. P. Basu does not believe in the excessive carbohydrate and lack of exercise view, but in some nervous causation associated with the high emotionalism of the Bengali. N. R. Sen Gupta is in agreement with him; he deplores the effects of Europeanisation and of modern civilisation in India and urges a return to the old simple village life; (but we fear that the inevitable trend of events prohibits this). Dr.

Ashutosh Roy enumerates no less than 14 ætiological factors, all of which he considers as important.

Dr. U. N. Brahmachari and P. K. Sen have shown that the average renal threshold for sugar in healthy Bengalis is about 0.175 per cent., a figure which is very nearly the same as for Europeans. In rare persons of both races the renal threshold is unusually high. L. M. Ghosal states that the severity of diabetes depends on the amount of "combined" sugar—i.e., sugar combined with the proteins of the blood. The less this is, the more severe the case.

A most useful paper is that by Dr. J. P. Bose (*Indian Med. Gaz.*, April, p. 173) on reducing substances in the urine. This gives a list of the substances which give a positive Fehling's, Benedict's or Nylander test and of how to identify them. K. M. Sinha gives a list of oto-rhino-laryngological complications of diabetes, including external otitis, otitis media, mastoiditis, nerve deafness, and pharyngitis sicca. K. Ardeshtir records a case of acute diabetic gangrene of the nose in an Indian female child aged 8 years cured by insulin therapy. Major Chopra, Dr. J. P. Bose and N. N. Ghosh have investigated the value of *silajit*, a mineral exudate with a high reputation in the indigenous systems of medicine, in diabetes. They find that its chief active constituent is benzoic acid and that it has no effect whatever on either the blood sugar content or on the amount of sugar in the urine. Major K. G. Charpurey draws attention to the creeper plant *Gymnema sylvestre* as of possible value in the treatment of diabetes. Investigation of its value has been undertaken by the Rev. Father J. F. Caius and Dr. K. S. Mhaskkar at the Haffkine Institute, Bombay. They find that administration of its leaves to rabbits produced a reduction of blood sugar in 27 out of 30 instances, but the work is still inconclusive in its results. Seven diabetic patients were treated with the plant and the results are encouraging. The pharmacological study of the plant is still in progress.

Diets, Food "Deficiency" Diseases, Epidemic Dropsy.

Lieut.-Col. R. McCarrison has continued his most important investigations into Indian dietaries at Bangalore and gave evidence before the Royal Commission on Agriculture in India. It is impossible to over-estimate the importance of this work: if the seed of disease is important, not less important is the soil in which it is sown, and that soil may be profoundly influenced by different diets, whilst disease itself may be produced by vitamins and other deficiencies in the diet. He urges the creation of a Nutritional Institute for India on the lines of the similar one already existing in Japan, and in this he will be strongly supported by those who have studied the problem. In the *British Medical Journal* (Oct. 23rd, p. 730) he deals with the difference between a good diet and a bad one. "The experiment demonstrates that a diet composed of whole-wheat, milk, milk products, sprouted legumes, uncooked vegetables and fruit, with fresh meat occasionally, far surpasses in nutritive value one composed of white bread, tea, sugar, jam, boiled vegetables, and tinned meat." The latter diet gives rise to stunting of growth, to physical inefficiency, and often to disease. The maladies of which the bad diet is apt to lay the foundation are lung disease and gastro-intestinal disease. Faulty food deficient in vitamins results in "depreciation of cellular function, and depreciation of cellular function is the foundation upon which disease is built."

The same author finds that the nutritive value of millet is greatest when it is grown on soil manured with farmyard manure. It is definitely less when chemical manures are used, and much less when the grain is grown on unmanured soil. Wheat, on the other hand, is of high nutritive value when grown on poor soil, and wheat grown on soil manured with che-

mical manures appeared to be much less nutritious than wheat grown on soil manured with farmyard manure. The experiments are still in progress.

With regard to *goitre* Colonel McCarrison finds that excessive ingestion of lime causes a 50 per cent. increase in the size of the thyroid in pigeons and rats, the increase being due to accumulation of colloid material. The administration of suitable quantities of iodine prevents this accumulation of colloid substance. The same author records that he came across ten cases of what he believes to be *lathyrism* in 1908 in the Gilgit Agency in a village at an altitude of 5,500 feet above sea level.

The year was characterised by a very severe outbreak of *epidemic dropsy* in Calcutta and Bengal, and many valuable lives were lost owing to the ravages of this disease. If the infected rice view of the causation of this disease be accepted, then the association of this severe epidemic with the meteorological conditions of the year calls for remark. In May, there was a sudden and very severe storm—almost a typhoon—in Calcutta and its environs, which must have caught many tons of rice in transit in open country boats from up-country to the mills in Howrah. The monsoon appeared to have set in on the 15th June—according to the usual official schedule—but it disappeared on June 16th, and did not really set in till July 4th. In September floods occurred, owing to heavy rainfall, and must have inundated rice godowns in Howrah. The late monsoon, occasional heavy downpours of rain, and high atmospheric temperature and humidity from May to August provided conditions eminently suitable for wholesale infection of stored rice with spore-bearing anaerobic bacilli of the *proteus* group.

A special meeting of the Calcutta Medical Club was called to discuss the situation, and a report on this conference appeared in the *Calcutta Medical Journal* for October, p. 196. In opening the conference, Sir Nilratan Sircar said that the dry form of epidemic dropsy—or beriberi—was uncommon, but that a few cases had occurred. The bacterial infection view had not satisfied Koch's postulates, whilst no other views as to the causation of the disease had yet reached the stage of proof. "In future it might be found that some views were partly right, others partly wrong." Treatment was at present symptomatic; and he had found benefit from vaccines of *B. coli*, streptococci, and electrargol. Calcium salts were also of value. Dietetic and hygienic measures in general were necessary. Dr. B. C. Roy thought that the majority of cases showed intestinal troubles of different types, either followed or preceded by an oedema of the feet. He did not consider the disease of dietetic origin, but thought that a large number of *B. coli* in the water-supply might produce the disease in conditions of avitaminosis. U. P. Basu considered epidemic dropsy to be a disease entirely different from beriberi. Diet had a very limited scope in treatment, and he had found that the addition of vitamins to the diet produced very little effect in treatment. He considered that the disease was an infectious one, and probably due to one of the *B. coli*—typhoid group of organisms. Dr. Mazumdar, Health Officer, Calcutta Corporation, gave an interesting account of the distribution of the disease in the city. Stoppage of rice usually controls the spread of the disease. Finally, a committee was appointed to investigate and report upon the epidemic.

A general account of the Calcutta epidemic is also given by S. N. De, (*Indian Med. Record*, July, p. 193), whilst H. N. Mukherjee has studied the blood-chemistry in epidemic dropsy cases. He finds that the uric acid content of the blood is markedly increased and the calcium content definitely decreased; the blood content of other constituents not showing any marked departure from normal. A most interesting paper is that by

Major (now Lieut.-Col.) H. Hingston. He records two family cases of anæmia of pernicious type following on epidemic dropsy. In both there were retinal hæmorrhages, and both patients improved rapidly on iron and arsenic. Both patients belonged to the same family household, which in all consisted of 23 members, all of whom suffered from epidemic dropsy after eating rice which had been bought from a village in the Jessore district. Ten of the 23 died, and it was reported that others of the same household who had gone to their homes elsewhere also died. The whole 1926 epidemic was one of the most severe and most dramatic on record in the Bengal Presidency, and recalls the small family outbreak recorded by Lieut.-Col. J. W. D. Megaw and R. N. Banerji at Allahabad in the *Indian Medical Gazette* for February 1923. In this latter case the infection appeared to be obviously an intoxication, almost certainly due to diseased rice, from the fact that diarrhoea was caused immediately upon the incriminated sample of rice coming into use. The symptoms were those of epidemic dropsy, but of a more acute type than any previously recorded.

Asthma and Bronchitis.

Although the importance of respiratory diseases as a cause of death is fully borne out in the different reports of Directors of Public Health of different provinces reviewed during the year, only a few papers on this subject have been published. M. A. K. Iyer draws attention to the occurrence of cases of asthma during the *padi* (rice) harvesting season in Southern India, and to *gingelly* oil, flowers—as used in garlands during ceremonial festivals—and articles of diet as causing asthma. P. N. Mitra records a case where asthma followed regularly upon the ingestion of meat in any form, and even after taking a peptone wine. G. R. Rao draws attention to "cotton asthma," due to exposure to when handling cotton fibre. J. E. Lesslar and K. Kanagarayer described three cases of bronchial spirochætosus seen during the course of one month's routine laboratory examinations and believe the disease to be far more prevalent than is usually recognised: the smears of the sputum should be stained by Fontana's method.

Short Term Fevers; Typhus, Dengue, Sandfly Fever Group.

Four papers call for review. Dr. W. Fletcher and J. E. Lesslar describe a typhus-like disease in the Federated Malay States with a close resemblance to the numerous cases of "tick typhus" described by Lieut.-Col. J. W. D. Megaw in India. The disease was sporadic and showed no tendency to spread from man to man. It is not carried by lice; it especially affected cattle-keepers, and had a patchy distribution which suggests that the conditions necessary for its occurrence exist only in certain localities. The most interesting point is that the cases can be divided into two groups, one of which show a high titre agglutination against the Kingsbury strain of *B. proteus* X₁₀, and the other of which do not agglutinate this strain of *B. proteus*, but agglutinate with other strains such as one from the Lister Institute.

Major F. A. Barker discusses the possible occurrence of Weil's disease in India. (*Indian Med. Gaz.*, Oct., p. 479). His memoir constitutes a monograph on the disease with special reference to Indian conditions which it is here impossible to summarise, but which is likely to remain a classic for some years. The epidemic infective jaundice which occurs every year in the Andaman Islands is in all probability Weil's disease. There are two chief types of this disease; in one the fever usually lasts for only two or three days, in the other it lasts for seven to ten days, and the mortality is high—24 per cent. There is seldom albuminuria and the rash was present in only a few cases. Major Barker again calls attention to the

difference between Japanese seven-day fever and the seven-day type of dengue which is common in India. The epidemic jaundice of the Andamans occurs between October and January; it is limited to the western portion of the island, where the work is agricultural or the draining of swamps; the mortality rate is too high for catarrhal jaundice, whilst the symptomatology corresponds to Weil's disease; forms suggestive of leptospiræ have been found in inoculated guinea-pigs.

Major H. Stott and V. Mangalik describe an outbreak of seven-day dengue in Lucknow in 1925, an article illustrated with typical temperature charts. The most striking feature of the outbreak was the relative rarity of cases of three days' duration. It would appear that the victims enjoyed little or no immunity, as it was especially amongst persons who had suffered previously that the three-day type of fever was most common.

Lieut.-Col. T. C. McCombie Young, Capt. A. E. Richmond, R.A.M.C., and Assistant Surgeon G. R. Brendish deal with sandflies and sandfly fever as studied in the Peshawar district. They find that the species of sandfly concerned breed most readily in moist earth mixed with vegetable organic matter in cracks in banks of earth. Neither mud nor dust will serve as breeding places. A considerable variety of symptoms was shown by the patients under treatment. The disease is essentially different from dengue in the complete absence of rashes and the lesser severity of the joint pains. Secondary rises of temperature appeared in a small proportion of the cases, but there was no recrudescence of severe symptoms with the secondary rise. Judging from the report we cannot as yet be said to have a definite reply to two questions; (a) How can a single case of sandfly fever be distinguished with any degree of certainty from a single case of dengue, except on epidemiological grounds; and (b) Such differences as have been described between the two diseases suggest that the virus is likely to differ in degree of virulence, but it is still possible that both viruses are one and the same, though modified by passage through two different insect vectors.

Snake-bite.

A curious—but not unusual—feature of the year has been the number of papers dealing with the subject of snake-bite. Capt. A. H. Harty records a case of cobra-bite in a patient in a mental hospital who seized a cobra by the tail, then by the head, and threatened other patients and the male nurses with it. The treatment adopted was free incision, rubbing in permanganate crystals, and intravenous antivenene: the patient recovered after showing severe symptoms, and his mental condition actually improved. Major L. A. P. Anderson records a case of bite by Russell's viper, which occurred at Kasauli. The patient was bitten whilst walking on the side of the hill, and immediately climbed up to the Central Research Institute bringing the snake—a 2½ foot specimen—alive and uninjured with him. He came under treatment within half an hour of receiving the bite. Eighty c.c. of antivenene was at once administered intravenously, and another 80 c.c. an hour and a half later. The only local treatment was painting the injured part with tincture of iodine. The steep climb of 500 feet up the hill after being bitten must have given the venom every chance to flood the circulation, and the patient showed drowsiness and thirst—also vomiting, probably due to shock—but made a complete recovery except for a small sloughing ulcer at the site of the bite. K. V. Raju records another case of bite by Russell's viper, the patient, a chowkidar, having been bitten at 7 p.m. He killed and brought the snake with him, and it proved to be a Russell's viper, 2½ feet long. He came under treatment within 15 minutes of having been bitten, and 35 c.c. of antivenene was immediately given intravenously, the site of the bite being cauterised with pure carbolic acid. Local swelling and oozing of hæmolysed blood from

the site of the bite were marked features of the case, but he made an excellent recovery. A. B. de Castro records a case of bite by *Lachesis cantoris*, identified as such, one of the small vipers prevalent in the Andaman Islands. The patient was bitten on the finger, and came under treatment 8 hours later, the arm being intensely painful, with bullæ present on the forearm, elbow and upper arm. The treatment adopted was free incision, arm baths in hot 5 per cent. permanganate, and an intravenous injection of calcium chloride solution. Abdominal symptoms predominated, but the patient made an almost uneventful recovery. (It is a little doubtful whether *Lachesis cantoris* can inject a lethal dose of venom in man. The reviewer treated some five or six cases of bite by *Lachesis gramineus* or *L. monticola*—identified as such—at Shillong during the course of three years by simple boracic fomentations, but saw no symptoms other than local pain and œdema and—of course—fright).

Mental Diseases.

Lieut.-Col. O. A. R. Berkeley Hill, in a paper which summarises reports from many different tropical countries, shows that general paralysis of the insane and tabes dorsalis are rare diseases amongst the indigenous populations of tropical countries. Why should this be so? Is it due to the antagonistic effect of chronic malarial infections in the tropics? The problem awaits investigation. On the other hand syphilitic paraplegias and monoplegias are common. The same author records notes of three cases, one of obsessional neurosis, one of sub-acute mania, and one of melancholia treated by prolonged sleep—a measure first advocated by Klesi of Zurich. The patient is first given a dose of hyoscine with a small dose of morphia, and then continuously kept under the influence of somnifene—a mixture of the diethylamine salts of ethyl-barbituric acid and allyl-isopropyl-barturic acids—given intramuscularly or intravenously for a prolonged period of from 130 to 160 hours. The bowels must be kept open by enemata, the urine removed by catheterisation, and fluid food administered when the patient is sufficiently awake to swallow it. The results appear to be good, and the method is of special applicability in status epilepticus.

F. Noronha deals with types of mental disorder as seen at the mental hospital at Bangalore. He shows that classification of cases must remain provisional until the true ætiological causes of the various types have been established. He also points out that the term "cure" should be used with great caution in mental, as in other, disorders.

S. L. Sarkar records details of a most interesting case of murder under insane hallucination. The personal history of the patient—for he could be regarded as nothing else—is recorded, and it is shown how the psychological trauma which led to the murderous act arose.

Miscellaneous.

A few papers call for review. Lieut.-Col. R. Row, in his presidential address to the Medical Research Section of the Indian Science Congress, 1926—published in the *Indian Medical Record* for February—dealt in a most able manner with the problems of medical education and medical research work in this country. His address has been much criticised, but his main contentions are true; that the status of medical education in India is badly in need of very great improvement, that the supply of trained medical research workers is quite inadequate to the country's needs, and that serious steps should be taken about both matters. His tribute to the Indian Medical Service, coming as it does from a distinguished Indian medical research worker, will be

much appreciated by both Indian and European members of that service.

Lieut.-Col. A. Proctor, in a valuable clinical paper deals with differential diagnosis in the tropics. Of 426 cases of malaria, 362 showed the "usual symptoms," but in 4 the cardinal symptom was severe anaemia, in 7 vomiting, in 6 gastric pain, in 2 colic, in 3 hæmatemesis, in 11 diarrhœa or dysentery, in 1 choleraic symptoms, in 3 difficulty in micturition; whilst 12 showed chiefly respiratory symptoms, 3 were in a state of collapse, 1 in a typhoid state, 7 had cerebral symptoms, and 4 were jaundiced. This list shows how protean may be the manifestations of malaria. Of patients subsequently shown to be cases of kala-azar, 120 were suffering from fever and enlarged spleen, 7 had fever with enlarged spleen and marked anaemia, 4 showed ascites as the chief symptom, 2 had genito-urinary symptoms, 5 had diarrhœa or dysentery, 1 an enlarged liver and jaundice, 2 cancerum oris, 1 suffered chiefly from joint pains, 2 from nerve symptoms, 3 from lung conditions, and 3 from vomiting; total, 150 cases. No less than 31 cases were in the first instance diagnosed as enteric fever. The author relies chiefly on the less toxic condition in kala-azar, the progressive leucopenia, and splenic enlargement in clinically distinguishing kala-azar from typhoid fever. Amœbic dysentery showed typical symptoms in 14 instances; but of 14 other cases, 1 showed fever as the cardinal symptom, lung affections were predominant in 5, peritonitis present in 2, dyspepsia only in 2, jaundice in 1, gall-stone colic in 1, whilst 1 case seemed typical of enteric fever. Colonel Proctor's paper should not merely be read, it should be studied from time to time, so full is it of valuable clinical hints.

Dr. P. T. Patel deals with cerebro-spinal fever in Bombay, in the *Lancet*. He concludes; "I agree with Simon Flexner 'that the analysis of cases of epidemic meningitis which have been presented furnish convincing proof that the anti-meningococcus serum, when used by the subdural method of injection, in suitable doses and at proper intervals, is capable of reducing the period of illness, of preventing in large measure the chronic lesions and types of infection: of bringing about complete restoration of health in all but a very small number of the recovered; thus lessening the serious deforming and permanent consequences of meningitis, and greatly diminishing the fatalities due to this disease.'"

Encephalitis lethargica is dealt with by Dr. Grace Stapleton, who records two typical cases in Indian female children, seen in Calcutta, whilst the same disease has been the subject of a number of isolated reports received, for most of which there has so far been no room for publication in this journal. It is clear that this disease definitely exists in India, and the profession should be awake to this fact.

Captain S. D. S. Grevil and Captain C. K. Row record the first case of undulant fever reported in Aden. Goats for meat are imported into Aden chiefly from Somaliland, and goats for milk chiefly from the interior of Arabia; in both areas diseases of goats are common and infectious abortion has been described from both areas. Lieut.-Col. R. Row reiterates his belief that the spirochæte of rat-bite fever in Bombay is morphologically different from the Japanese strain, that it does not possess terminal flagella, and that it is readily demonstrated by the dark ground method. Dr. D. A. Turkhud and Dr. C. G. Pandit describe an epidemic of an alastrim-like disease in Madras, occurring during the presence of a severe epidemic of true small-pox. The results on inoculation into monkeys were at first inconclusive, but the virus was finally established in these animals; in rabbits only superficial vesiculation was obtained; in calves results were indefinite, but the interposition of another animal host between calf and calf appeared to convert the virus into a true vaccinal one. Alastrim is thus clearly a disease of the variola

family. A. K. Mukherji records an outbreak of anthrax in 4 persons who had killed and dressed the meat of a diseased cow; all 4 died within 3 to 5 days.

Dr. E. Houseman deals with some important points arising from a study of life-insurance data obtained in the examination of 2,244 Indians and 1,473 Europeans for life-insurance in Calcutta over a period of some years. Only 12 per cent. of the Indians were classified as A lives as against 27 per cent. of the Europeans. The chief defects amongst Indians were inferior physique, obesity, hydrocele, albuminuria, and hernia—all of which defects are about twice as common amongst Indians as amongst Europeans. Strangely enough there were very few cases of glycosuria, probably because the applicants were mostly young men. Syphilis was found to be relatively infrequent among the better-class Indians, but very common among the lower classes. The causes of death in Indians in order of frequency were; pneumonia, heart failure, phthisis, apoplexy, dysentery and diarrhoea, diabetes, liver diseases—including abscess, enteric fever, undifferentiated fevers, malaria, cancer, kala-azar. Among Europeans there were more deaths from heart failure and cancer, but considerably fewer from all the other causes.

Colonel F. H. G. Hutchinson gives an interesting analysis of cases of heat-stroke in Allahabad. There is a clear association between the occurrence of prolonged heat waves and the liability to the disease. All the "epidemics" occurred after rather long periods of great heat, viz., an average maximum temperature of 108°F. and over, and an average mean temperature of 93°F. and over. There is nearly always a "warning period," during which the night temperature is exceptionally high. The conditions existing in Allahabad are different from those in some other parts of India where the disease is prevalent. In Allahabad the disease is nearly always associated with extreme dry heat, while in other places the wet-bulb thermometer may be found to be a more reliable guide. The influence of exercise was studied; after a game of football with the air temperature at 100°F. and a wet-bulb temperature of 82°F., 4 out of 11 players had temperatures of from 100°F. to 100.4°F., the rise in body temperature being from 1.4°F. to 2°F. above normal.

SURGERY IN INDIA IN 1926.

Lieut.-Col. W. L. Harnett, F.R.C.S., kindly contributes the following review:—

"As usual the surgical papers published during the year consist mainly of records of unusual cases, but there are several which deal with questions of treatment on which there is difference of opinion and in which the views expressed by the writers are not in accord with those held by the majority of surgeons. First in importance comes Lieut.-Col. H. Hallilay's paper on the operative treatment of fractures. We gather that Col. Hallilay is an uncompromising advocate of the policy of treating all fractures by open operation, which was first put forward 20 years ago by Sir Arbuthnot Lane as the treatment for all cases in which "accurate apposition of fragments is unobtainable and restoration of the bone to its normal form is of importance to the individual." Col. Hallilay goes on to speak of the lessons of the war as though they led to a wide adoption of Lane's teaching, which surgeons have subsequently failed to take advantage of in civil life. But the conditions of the war were different widely from those met with in civil practice, in that all the fractures were compound and in many cases heavily infected at the time of injury. It was soon found that the great secret of success was the thoroughness with which the primary cleansing operation was undertaken and the maintenance of good position subsequently by various kinds of extension appa-

ratus. The introduction of any form of mechanical fixation by plates or screws was found to militate against success by prolonging the period of sepsis and leading to necrosis of the bone ends. In Sir Anthony Bowlby's memorandum on the treatment of fractures during the last stages of the war we find it stated that "with the improvements in splinting and extension the need for fixation operations became extremely rare. They were not employed in as much as one-half per cent. and then were almost limited to the encirclement of fragments by wire. Plates and screws were practically never employed." It is the improvements in methods of splinting and traction which were developed during the war, due mainly to the work of Sir Robert Jones, which have not been taken full advantage of by the civilian profession, and it is for this reason that "fracture units" are advocated in general hospitals, so that students may study the methods employed by experts and be in a position to make use of them afterwards in their practices. The disadvantages of treatment by extension to which Col. Hallilay refers are due to failure to study the proper methods of applying extension so that it may be mechanically efficient; if this is done it will be found that efficient extension can be applied to the femur for instance with a weight of 7 to 10 lbs. and that the strapping will not slip until it has fulfilled its function. The need for the enormous weights referred to in the article and which neither strapping, calipers nor bone pins can be expected to stand, will then never arise. Of course it would be absurd to deny that there are many fractures which can only be efficiently treated by operation, but whereas this was an increasing class before the war, it has since much decreased with the improvement of non-operative measures. Border line cases there will always be of course, but broadly speaking "the indication for operation on recent closed fractures, in the absence of damage to nerves and vessels, is the inability to bring fragments into such opposition and alignment that good functional results will follow in a reasonable time." (Scudder). In many cases it is impossible from the outset to fulfil these conditions and in such the decision to operate should be taken at once, in others traction methods should first be given a fair trial. Old fractures with shortening and angulation fall into a different category, operative measures are usually necessary, whether a reconstruction operation or an orthopædic operation for remedying the deformity depending on factors for which general rules cannot be laid down. It is impossible here to discuss the application of these principles to individual cases, but whilst Colonel Hallilay is to be congratulated on his results (56 cases with no mortality and presumably primary union in all cases is no mean achievement), he cannot be congratulated on his choice of cases. Most of his cases of supra-condylar fracture of the humerus which were plated occurred in children under 13, in whom Jones' method of reduction, if properly done under anaesthesia, gives admirable results without the drawback of a steel plate screwed to the growing bone. Intracapsular fractures of the neck of the femur are treated nowadays by Whitman's method with good results, whilst those of the shaft of the femur in children, especially when transverse, as several of those quoted were, give perfect results when properly treated by extension methods. The details given of some of the cases are too meagre to allow of criticism, but the above instances will suffice to emphasise the point we wish to make, which is that advice such as is given in this paper is not good advice to broadcast over India. Facilities for operations on fractures are not to be found everywhere, nor are surgeons with the necessary skill available in every town in India. If operative treatment were by universal consent the only proper treatment, this objection would have no weight, except as an argument for training our students in these methods in sufficient numbers to cope with the cases. But if equally good results can be obtained with less risk to the patient (and we all know that when one of these operations becomes septic or fails for any other reason the patient is worse off than

before), it is our duty to train students in these simpler methods. Such methods are available and are being widely taught in the British Schools and it is surely the duty of surgeons in this country to demonstrate by teaching and writing methods which are within the capacity of the general practitioner to apply.

In last year's review reference was made to the decline of the operation of litholapaxy which appears to be taking place in certain parts of India, though not we are glad to see in the Punjab and United Provinces. Attention is again called to this subject by a paper by S. C. Das Gupta of Khatmandu, Nepal, in which a long and detailed description of the operation of suprapubic lithotomy is preceded by the statement that it is the preferable operation. With this we most emphatically disagree. There are many well-recognised contra-indications to the operation of litholapaxy, but as the surgeon's skill increases he will find his field gradually enlarging. The systematic use of the cystoscope before operation will ensure that stones lying in a diverticulum of the bladder and cases complicated by enlarged prostate are not missed, whilst its employment at the end of the operation will make sure that no fragments are left behind, so that there is no more reason why a stone should recur after litholapaxy than after lithotomy, apart from the descent of a fresh stone from the kidney. The use of the simple kidney function tests of McLean will enable the operator to ascertain whether the kidney has been damaged or not and so to decide which operation is preferable, according to whether drainage of the bladder is indicated or not. No doubt the operation requires more skill and the instruments are expensive, but these objections should not weigh against the convenience to the patient of a convalescence of a few days instead of several weeks and the saving to the hospital in nursing and dressings will soon make up the difference in cost. In Upper and Western India this matter has been decided long ago by public opinion and, as a writer said last year, there is no surer way of emptying the beds of a hospital than by starting to cut for stones instead of crushing them, but on this side of India it appears that public opinion requires to be educated.

Several papers have appeared during the year on the use of bismuth in the treatment of syphilis, one in particular by C. F. Chenoy based on records of 700 cases. The records show clinical successes, but the Wassermann reactions, when done at all, were performed immediately after the termination of the courses and there was no attempt to follow up the cases. It is now the opinion of all authorities, based on follow-up work extending over several years, that whilst bismuth is of great value as an adjuvant to the treatment by arsenical preparations, it is not capable of replacing these latter. It may be given at the same time as the arsenical injections or in alternate courses, but the length of the courses has not been diminished thereby, nor the necessity of testing the blood at intervals after the termination of the courses. Papers such as these are therefore apt to be misleading to the general reader. The same remarks apply to Mr. R. J. L. Sladen's paper on the use of mercurosal and to that by S. B. Surti on Benzo-bismuth. C. F. Chenoy records an interesting case of sudden death after an injection of Neo-trepol, presumably from capillary embolism in the central nervous system, which shows the importance of making sure that the needle is not in a vein before the actual injection is made.

Strange foreign bodies are frequently found lodged in the body cavities and the circumstances under which they got there are not always clear. Mr. Narayanan records the removal of a stick from the abdomen after attempted abortion, J. F. Henriques of a tooth-stick which had been swallowed and had burrowed out of the stomach and formed a perigastric abscess, and Dr. Anderson of a twig found in the rectus muscle, also after attempted abortion. The spontaneous expulsion of a bead from the bronchus recorded by Dr. Pradhan is a

happy termination to a case which might have ended quite otherwise.

Operations on very old men are represented by a case of Dr. Banta Singh's of excision of an adenoma testis in a man of 80, and of excision of an enlarged prostate by the perineal route with removal of a calculus in a patient of 85 by Dr. Khushi Ram, both creditable performances done in small *mofussil* hospitals.

Major J. B. Hance's case of enucleation of a myeloma of the radius with successful bone grafting into the resulting cavity is a fine piece of surgical work; so too is J. K. Sen's case of excision of a cervical rib in a case of brachial neuritis.

It is not often that the healing of a duodenal ulcer after gastro-enterostomy can be demonstrated on the operation table, but such a case is recorded by Major W. C. Paton. Intestinal obstruction due to *Ascaris lumbricoides* is a condition hardly mentioned in the books, an example of which is recorded by Dr. Nanharya in which 80 worms in all were removed at operation and passed afterwards. Major J. B. Vaidya records a successful case of splenectomy for wandering spleen. Dr. S. K. Ray discusses in the *Calcutta Medical Journal* the relationship between appendicitis and meteorological conditions. He finds that in a series of 125 cases examined there was evidence of dysentery in the history in 35 per cent. and actual symptoms associated in 22.8 per cent. That the appendix may be involved in a colitis and give rise to difficulty in diagnosis is a fact which is not as widely recognised as it should be. Dr. Ray's conclusion as to the seasonal distribution of the two conditions, arrived at by an elaborate mathematical analysis, would appear to rest on insecure premises, based as it is on clinical diagnosis and not on complete *post-mortem* examinations."

In the same journal Lieut.-Col. W. L. Harnett reviews recent progress in the operation for senile hypertrophy of the prostate, treatment of bladder growths, testing of kidney function and the use of diathermy in genito-urinary surgery.

To those interested in Indian history Dr. S. N. Consul's thoughtful article on "Ancient Hindu Surgery" may be commended.

Of other points in connection with surgery, Y. Deva advocates the use of adrenalin in paraphimosis; the end of the penis including the strangulated band being wrapped in a compress of absorbent cotton-wool soaked in a mixture of equal parts of 0.1 per cent. adrenalin chloride and 10 per cent. cocaine hydrochloride. After 15 minutes application under a little pressure, the prepuce can usually be restored to its normal position. S. L. Rodrigues advocates a 1 in 8 bismuth subnitrate ointment for wounds and mycotic infections of the skin; also of liquor bismuthi et ammon. citras as a local antiseptic. N. Gopalan writes of sterilised coconut oil as a cheap and efficient dressing for burns; and Jemadar Matlook Khan of the use of a paste of gram and cement in alternate layers as a substitute for plaster of Paris in *mofussil* practice.

Lieut. J. P. Arland has tested the effects of vasoligation in dogs and man, and of testicular grafts in man. In two senile dogs which were ligated a marked increase in appetite and a return of full sexual potency were noted, the changes being most marked between the second and third week after operation. In man, however, both vasoligation and testicular grafts from monkeys and sheep gave discouraging results—15 cases. The transplants led to acute inflammatory changes without producing any change for the better.

Lieut.-Col. W. F. Brayne records a case of vaginal calculus, 1.8 cm. by 1.2 cm. This was lying in the posterior fornix; it consisted of calcium phosphate with a

little uric acid, and had a fruit seed in its centre. From the dense character of the adhesions around it, it had probably been there for some years. A. C. Sen Gupta records removal of 18 stones from the kidney; an abscess had formed in the lumbar region, had been previously opened, and two sinuses led down to the upper pole of the right kidney, where the stones lay.

An interesting case of a rare condition is that of a woman aged 20 with diffuse hypertrophy of both breasts, recorded by Nisanth Ghosh; one organ weighed 7 lbs. and the other 9 lbs. after removal. Intravenous iodine continues to be advocated by different writers for many different septic conditions; in pulmonary disease by V. J. Lopez, in septic abortion by B. J. Bouché, in puerperal sepsis by S. R. Ingle, and in plague by A. C. Bharadwaj.

Major K. K. Chatterji, B.M.S., discusses cancer in India, and refers to several especially tropical factors in its aetiology, such as the frequency of tropical granulomata. He has obtained promising results by injections of the ethyl ester margosate of copper, whilst in some cases this was combined with x-ray exposures.

An important contribution to the subject of abdominal surgery in India is contained in the *Annual Report for the Madras General Hospital, 1925*, reviewed in our issue for last May. In this (p. 254) Lieut.-Col. E. W. C. Bradfield first analyses 115 cases of gastric or duodenal or jejunal disease operated on over a period of some years. Operation in duodenal ulcer—which cases constituted 86 of the series—has on the whole good results. The tuberculous abdomen is of special importance in Indian surgery, and there are several varieties of the disease; the ascitic variety, where operative results are poor; the fibro-adhesive type of tuberculous peritonitis, which is often accompanied by acute complications. Ileo-cæcal tuberculosis tends to produce matted masses of hyperplastic growth, and the operative treatment where possible is excision of the cæcum and any part of the ileum involved and anastomosis of the ileum to the ascending colon. The report should be consulted in the original by those who see much of this type of work in India.

Other isolated cases of interest include K. M. Nayak's case of acute hæmorrhagic pancreatitis, where the patient died on the operating table; and a case of infection of the bladder by a leech recorded by P. N. Mitra. In this case the leech entered the urethra of a boy of 8 when he was fishing in a marsh and made its way into the bladder; efforts to remove the leech by catheterisation were unsuccessful, but it was finally killed *in situ* by injections of strong salt solution and adrenalin by the catheter, and voided by natural means.

Veneral Diseases, etc.

Only a few papers call for comment, and those by Mr. Sladen, C. H. Chenoy, and S. B. Surti have already been commented on above by Col. Harnett. Sub-Assistant Surgeon D. D. Gulati deals with yaws in the Chin Hills, pointing out that the disease has long been prevalent in that area, and shows a marked familial distribution. Major G. G. Jolly describes the distribution of yaws in Burma. The chief focus is in the Lower Chindwin district of Upper Burma, and the races who are most affected are actually called "yaws"—which may be a coincidence—and are supposed to be descended from the Shans of Assam. It is suggested that the name "yaws" may have originated from the prevalence of the disease among these people, but history throws no light on this question. Major Jolly believes that the disease has existed for centuries in Burma, just as Dr. Ramsay disagrees with the late Dr. Powell, who believed that yaws was first introduced into Assam from Ceylon in 1887. In kindly contributing to this review, Lieut.-Col. J. W. D. Megaw agrees with Major Jolly and Dr. Ramsay: he saw some cases of yaws in 1903 in a village in the extreme north-east of Bengal, and the

patients informed him that the disease was very common in the village. It might have been of recent introduction, but this does not seem as likely as that yaws had existed for a long time locally as an indigenous disease. Dr. Powell's account of cases imported from Ceylon admits of no doubt, but there is no reason why the disease should not have been imported into a country where it already also existed.

HYGIENE AND PUBLIC HEALTH.

International Public Health.

Col. J. D. Graham, Public Health Commissioner with the Government of India, reviews the year as follows:—

In *The Indian Medical Year* for 1925 I endeavoured to trace as briefly as possible the general trend of policy and of development in public health matters, more especially dwelling upon the dominant note which is paramount at the present time, namely, the entry of public health into the domain of internationalism. In the short note which follows I have endeavoured to bring the line of thought of 1925 up-to-date, having in view the various pertinent occurrences of last year (1926).

It is again necessary to reiterate the fact that such health activities in India as are inter-provincial, national and international, as well as those connected with overseas pilgrim traffic, quarantine, control of major ports, emigration, immigration, statistics and epidemiological information generally continue to be, in accordance with statute, the concern of the Central Government.

Last year, I recorded the initiation of the Eastern Epidemiological Bureau of the League of Nations for the diffusion of epidemiological intelligence throughout Asia and East Africa. In accordance with the suggestion of the first meeting an Advisory Council was established to meet annually in Singapore to review the work of the Bureau during the previous year, and to note, in an advisory capacity, any or all of the activities of the Bureau. This Council was established at the meeting which was held on 4th to 6th January 1926 when it was resolved that the member for India should be elected President and that the members for Indo-China, Netherlands East Indies, Siam, Japan and China be elected Vice-Presidents for 1926. As delegate for India I had the honour to preside at the first meeting, when representatives of Australia, British North Borneo, China, Federated Malay States, Indo-China, Hong-Kong, Japan, Netherlands East Indies, Siam, Straits Settlements, Philippine Islands were present, as well as Dr. Rajchman, Director of the Health Section of the League and some of his secretariat on their way back from Tokio, and Dr. Heiser of the International Health Board of New York.

The first meeting was held between 4th and 6th January 1926. Its proceedings, which have been recorded in the published minutes, also dealt with the progress made by the Bureau during the year. The work of the Bureau has now extended so as to include an area as far west as Cape Town and Alexandria and as far east as Honolulu. It has been considered necessary to divide the countries served into 4 groups—a Western Group dealing with the East Coast of Africa and the Asiatic Coast as far east as, and including, British India; a Central Group comprising Malaya, the Dutch East Indies, Borneo and the Philippines; an Eastern Group including the Asiatic Coast from Siam to Siberia, with Japan and Formosa; a Southern Group consisting of Australia, New Zealand and the South Sea Islands.

All the administrations represented agreed that the Bureau was rendering very valuable services. I would recall that the essential task of the Bureau is to collect, by cable, information on the prevalence of epidemic diseases in the various ports, to obtain information regarding the movements of infected ships, to classify this

information and re-telegraph it in the form of weekly bulletins which are broadcasted every Friday "gratis" by the French station at Saigon. Various other countries such as Malabar (Java), Sandakan (British North Borneo), Bombay and Madras then relay these messages by wireless free of charge so as to circumvent atmospheric and to enable as many places as possible to "pick up," thus reducing costs.

Many of the administrations concerned were able to announce very considerable subventions to the Bureau, which, in spite of the annual grant for 5 years of 25,000 gold dollars per annum from Rockefeller funds, showed a considerable deficit. The idea of bringing home to the League in Geneva that this Bureau was a legitimate outcome of its development and had definite financial claims on it was put forward by resolution and has eventually been accepted both by the Health Committee and by the Council at Geneva. This is of great importance as it will ensure the future financial security of the Bureau and the continuance of its work.

Another very important aspect of the development of the Bureau's activities centres round the co-ordination of international research problems in the Far East. The Council decided to make a serious study of the great international public health problems of the East on the lines that the League had adopted in Europe, i.e., by setting up expert committees composed of directors of research institutes, in those countries where enquiries of this nature were in progress or were about to be undertaken, with the addition of experts from Europe selected for their competence in the matter. Such problems as the value of oral vaccination against acute intestinal infections, the endemicity of cholera, certain aspects of bubonic and pneumonic plague, of malaria and of tuberculosis were all suggested for co-ordination work. The Health Committee approved of these in principle, noted with interest the recommendation for the creation of expert committees to co-ordinate research as indicated, and resolved, in particular, to proceed at once in consultation with the administrations concerned to the constitution of an expert committee to deal with the question of oral vaccination against acute intestinal infections. This Committee was constituted and met at the Pasteur Institute, Paris, at the end of June 1926 and India was represented on it by Lieut.-Col. F. P. Mackie, O.B.E., I.M.S., and myself. Its conclusions have been circulated by the League to all countries in Asia which are likely to be interested. This may represent a development to which exception might be taken by some; but, in its broader aspect as a matter of international concern, it can hardly be objected to.

In this connection the speeches of the Indian members to the 7th (ordinary) session of the Assembly of the League are of importance. It will be remembered that at the second committee of the 6th Assembly, Sir Atul Chatterjee had expressed his approval of the Singapore Bureau and suggested that the Health Organisation might profitably devote more attention in future to health questions in Eastern countries. The attention of the 7th Assembly was therefore directed again to this means of interesting the East in League work in the speech of His Highness the Maharaja of Kapurthala, who saw in the establishment of this Bureau an indication that the League, which had in its early years been obliged to devote its attention and its energies mainly to the European problems connected with the Great War, was now able to carry its activities further afield, and thus increase its powers as a world-wide organisation. His Highness made a special appeal for financing the Bureau from Geneva and this was supported by the delegates for Uruguay and Japan and also by Sir C. P. Ramaswami Ayyar, K.C.I.E., who followed with a speech of great weight which has been reproduced by the League, made a great impression on the Committee, and, in effect, settled the question of support from Geneva.

By the end of the year, the Bureau was receiving reports from 112 ports in Asia, Australasia and the East

Coast of Africa and was having its weekly bulletin broadcasted "gratis" by an increasing number of important wireless stations in the Far East.

The Bureau International D'Hygiène Publique, which is a permanent Health Bureau established under the Rome Agreement of 1907 and meets twice annually in Paris, was attended, under Secretary of State's order, by the Public Health Commissioner in person at the May Session 1926 at which 32 countries were represented. The "ordre du jour" gives the general line of discussion and the "proces verbaux" of this has been printed by the "Office" and circulated by me. As previously arranged, a fairly complete series of notes on current research work and of reprints, most of them translated into French, was communicated to the Bureau personally. Notes on

1. Rats and their parasites in connection with plague propagation
2. Leprosy
3. Work of the Kala-azar Commission and adjunct enquiries
4. Lathyrism
5. Tabes and general paralysis
6. Ankylostomiasis
7. Malaria

were communicated, as also reprints of papers by the Kala-azar Commission and by Major Berkeley Hill, and copies of the malarial map of India by the Malarial Bureau, Kasauli. These were all much appreciated and were not without their effect on members of the Bureau, most of whom also served as delegates to the International Sanitary Conference.

The work of the Bureau ran into that of the International Sanitary Conference which was perhaps the most important event of the year. It had been expected patiently for two years and preparations for it had been under way by the Office International since 1922. The Conference, which was convened by the French Government, met in Paris at the French Foreign Office, Quai d'Orsay, from May 10th to June 19th, and was attended by over 180 delegates from 79 nations. The Convention of 1912 which is at present in force was thoroughly revised and brought up-to-date from the technical and legislative points of view; and the new instrument was signed by the majority of the delegates and now awaits ratification. The final official French text has just appeared; but the Ministry of Health undertook a preliminary translation of the provisional text and this has been in circulation since October. As Public Health Commissioner I attended as one of the delegates for India along with the late Secretary for the Commerce Department (Sir David Chadwick, C.S.I.), and the late Mr. Tata of Bombay, and we were able to sign the Convention on behalf of India with only one reservation regarding compulsory notification of disease. We presented two reports (one confidential) regarding the Conference to the Right Hon'ble Earl of Birkenhead, His Majesty's Secretary of State for India, and one of these will, I hope, shortly be published in full in the *Gazette of India*. I hope at an early date to send the text of this publication for the *Indian Medical Gazette* as it will be of interest to all who have to study the Convention. Any detailed remarks here will therefore be unnecessary regarding the 5 parts of the Convention beyond pointing out that the two main principles underlying the Convention have not been interfered with.

These are:—

- (a) that determination of measures by health authorities on the arrival of a ship should be based on its state of health and sanitary history and not

on the state of health of the port from which it comes,

- (b) that Governments should give full and prompt information about epidemic diseases in their countries and ports, and the measures taken to combat them.

The present Convention shows better arrangement, clearer enunciation of main principles and the removal of some unnecessary provisions. It has speeded up work on more up-to-date lines in connection with plague and rats and their relations to shipping. It deals with the five chief diseases whose method of transmission is well known, i.e., plague, cholera, yellow fever, typhus and smallpox. It has attempted to grade up the equipment of ports and to establish on every seaboard at least one port adequately equipped to deal with all infected vessels, and it further lays down the maximum action which, in the absence of special reasons, may be taken when a ship arrives and is classified as healthy, suspected or infected. It also seeks to encourage regional agreements between different countries, and places an obligation on every country to give prompt and complete information of outbreaks on conventional diseases. Various other provisions exist which require special study; but the Convention is a distinct advance on that of 1912 in the interests both of public health and of the shipper.

The meeting of such a large number of international experts in public health for such an extended period was as stimulating an experience as can be well imagined. One was forced to realise how essential was the personal factor when questions requiring compromise arose—and these were many. The fact that, as delegate for India, I had been able to speak at the "Office" International on recent research work in India in regard to some of these diseases was not without its influence in enabling compromises to be arrived at easily.

Whilst the Conference was in progress a further development took place between Great Britain and India on the one hand and the Netherlands East Indies Government on the other in regard to a final adjustment of the international difficulties which were mentioned in last year's report and which had arisen in connection with the quarantine station at Kamaran in the Red Sea. Some twenty meetings took place between the British, India and the Dutch representatives and these eventuated in the drawing up and signing at the British Embassy towards the end of June of an Anglo-Dutch agreement which was satisfactory to all three Governments and came into force from 1st January, 1927. This agreement gives a certain measure of joint medical control in the running of the Kamaran Station.

The changes envisaged in connection with the central control of our major ports did not advance much further during the year. This was due to the delays inseparable from certain preliminary legislative alterations which are now being carried through. The necessity for further alterations in our port policy so as to bring it into line with the new Convention if and when it is ratified had also to be considered. This will lead in time to certain definite alterations in the Merchant Shipping Act, the Indian Pilgrim Act and the Indian Port Rules, all of which will require close study.

A feature of very great interest was the visit of the Royal Agricultural Commission to India in October 1926. The questionnaire of the Commission contained only one subject on which medical opinion was sought, that was the 'Welfare of the Rural Population.' With this as a text the Public Health Commissioner presented a note dealing with the various aspects of diseases generally, of nutritional and deficiency diseases, of research, of education and of propaganda *vis-à-vis* agriculture; he presented at the same time to the Commission a copy of the resolution of the Research Worker's Conference passed at the last two Conferences. Other administra-

tive and public health officials were asked to give evidence, e.g., Major-General Hutchinson, Major Russell, Dr. Bentley and also Lieut.-Col. McCarrison whose laboratory and work at Coonoor were specially visited by the Commission. I have authority for saying that the Commission appreciated very highly the evidence which was obtained from the medical men interrogated, and most of which went to prove the close association of agriculture with the health of the population.

Early in the year the Far Eastern Association of Tropical Medicine held its biennial Conference at Tokio and the Government of India was represented by Lieut.-Col. F. P. Mackie who, whilst on leave, travelled via America from England to Tokio for this purpose. Other provinces were also represented. Lieut.-Col. Mackie's experiences have been published by Government of India.

The League of Nations organised their first interchange of health officers in the Far East in Asia during 1926, and they timed the meeting so as to follow immediately that of the Far Eastern Association of Tropical Medicine Conference in Tokio. The interchange took place in Japan, Chosen and Manchuria, and Lieut.-Col. Mackie attended as the representative of the Government of India and returned to England via Siberia. The results of his deputation in this connection have been printed by Government of India and were reported in the issue of this journal for March, 1927.

I have mentioned the more important happenings of the year; but many other points occurred which were of minor importance. I have also omitted all detailed reference to research under the Indian Research Fund Association which had its former grant almost fully restored. Enough, however, has been said to show how rapidly the international side of our work and of our obligations in the domain of public health is opening up, and how essential it is for us to have an adequate appreciation of what is going on throughout the world and to be able to take our place in line with other nations when opportunity presents itself either in regard to new developments or in regard to the organisation of work on international lines."

With regard to the Provinces, reports have been received only from Madras and Burma; (and in this connection the reviewer would welcome *brief* reviews from other Provinces for next year's review; as they summarise the provincial public health position far better and in a more up-to-date manner than do reviews of somewhat belated annual reports).

Madras.

Lieut.-Col. A. J. H. Russell, Director of Public Health, Madras, reviews the year as follows:—

The Public Health Department has been able to continue its normal expansion during the year. In two additional municipalities first class Health Officers were appointed; for four of the smaller municipalities, second class Health Officers were sanctioned; whilst, in response to repeated applications, the Government sanctioned the addition of 32 Health Inspectors to the provincial staff for rural areas.

The District Health Scheme continues to work satisfactorily, and the District Health Officers, with one or two exceptions, have done very good work both in the prevention of cholera and other infectious diseases and in the investigation of different types of morbidity which in the past have been buried in the general mass of deaths labelled "all other causes." For instance, the District Health Officer of Ganjam sent in a very interesting report of a curiously isolated outbreak of epidemic dropsy in a village of his district. Another officer made

special investigations into the plague foci in his district, while several have given valuable assistance in the control of the field work in connection with the anti-cholera vaccine and bili-vaccine investigations. Although the District Officers have many routine duties which occupy most of their time, it is obvious that our knowledge of disease cannot increase as it ought unless observations such as these are recorded, and every effort is made to stimulate the health staff to continued effort in this direction. The International Health Board accepted the Government's nomination of one of the Assistant Directors of Public Health to a Rockefeller Scholarship, and this officer is now studying in the Johns Hopkins University in Baltimore, where he is devoting most of his time to the subjects of vital statistics and epidemiology. One of the assistants in the King Institute also was nominated to a scholarship, and he is specialising in public health bacteriology with a view to the expansion of public health laboratory work in the Presidency. A number of public health laboratories, one for each group of districts in the Presidency, are urgently required if public health work is to be expanded in the right directions.

Malaria.—The Malaria Unit attached to the King Institute, Guindy, has, at my instance, been deputed to carry out investigations into the prevalence of malaria in Bimlipatam municipality and in the Mopad Canal area of Nellore District. The former report indicates the effect of decay—industrial and economic—in producing conditions favourable to an increased incidence of malaria in a seaport town. In the latter area, an intense infection has followed the construction of an artificial lake and irrigation canals in a previously dry tract. Both reports demonstrate the urgent necessity for continuous work of the kind in this Presidency.

The Indian Research Fund Association placed at my disposal a sum of Rs. 10,000 to be used for malaria survey work, on the condition that the local Government provided the salary of the malariologist in charge. For financial reasons, the Madras Government regretted their inability to sanction the appointment during 1926-27, and the grant was surrendered. The proposal to appoint a Special Malaria Officer to work under the Director of Public Health has been, however, included in the public health budget for 1927-28 and has been strongly recommended. It is hoped that the proposal will be accepted and that within the next few months it may be possible to make a start in this very important part of public health work in the Presidency. The appointment will be no new one,—it will be only a resuscitation of work sanctioned as long ago as 1912, and carried on until the outbreak of war in 1914.

Vaccination and Small-pox.—The mortality from small-pox during the last five years has steadily decreased, the figures being as follows:—

1922-23	..	..	..	26,526
1923-24	..	..	..	22,626
1924-25	..	..	..	20,227
1925-26	..	..	..	14,498
1926-27 (7 months).	..	..	..	5,831

During 1925-26, nearly two million persons were vaccinated with a success rate of 94.7 per cent., as compared with 94.6 per cent in 1924-25, and 90 per cent in 1923-24. The problem of maintaining a lymph vaccine of high protective value in Madras may therefore be considered to have been solved, and the figures quoted above encourage the hope that small-pox is one of the important preventable diseases which is gradually being brought under control in this Presidency.

Teaching of Hygiene.—The proposals regarding the re-organization of the teaching of hygiene in the Medical College, which were mentioned in last year's notes, were

accepted by Government. As a result, a separate Professorship of Hygiene, to be held by an officer of the rank of Assistant Director of Public Health, has been created. The teaching of bacteriology has been given over to the Assistant Director, King Institute, and in addition the following arrangements have been made for the teaching of special subjects:—

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| 1. Health Officer, Corporation of Madras. | Practical sanitation. |
| 2. Assistant Director of Public Health (Epidemiology). | Epidemiology, infectious diseases and management of fairs and festivals. |
| 3. Assistant Director of Public Health (Vaccination). | Sanitary law, vital statistics and practical vaccination. |
| 4. Assistant Director of Public Health (Propaganda and Maternity and Child Welfare). | Health propaganda and maternity and child-welfare. |
| 5. Medical Officer in charge of the Venereal Diseases Department of the General Hospital Madras. | Venereal diseases. |
| 6. Medical Officer in charge of the Infectious Diseases Hospital, Madras. | Clinical teaching on infectious diseases and administration of infectious diseases hospitals. |
| 7. Director of Town Planning. | Town planning. |
| 8. Superintendent, Tuberculosis Hospital. | Tuberculosis, clinical and administrative. |
| 9. Sanitary Engineer .. | Sanitary engineering. |
| 10. Technical Superintendent, Sanitary Engineer's Office. | Sanitary engineering. |

As a result of this re-organization candidates for the University degree of B.S.Sc., and for admission to the Public Health Department, will now be presented with a much wider view of the subject of preventive medicine. In addition the Madras Government have accepted the proposal to depute annually three of their Health Officers to the School of Tropical Medicine, Calcutta, where they will undergo a 6 months post-graduate course. This course has been made compulsory for all Health Officers in the cadre and should prove of immense benefit to the officers themselves and to the Public Health Department of the Presidency.

Enteric Fever.—There is increasing evidence to show that the enteric group causes great havoc both in municipal and rural town areas. More than one typhoid epidemic has been reported by officers of the Public Health Department, and one or two towns in the West Coast districts seem to suffer intensely from this disease. Until water and milk supplies are placed on a more satisfactory basis, it will be difficult to combat or prevent these outbreaks, but meantime additional information on the subject is very desirable and further investigations are necessary.

Relapsing Fever.—During the year, relapsing fever has been reported only from three districts, Coimbatore, Trichinopoly and the Nilgiris, and in no case was there anything in the way of a serious outbreak. The insidious manner, however, in which it continues to

crop up in the Nilgiris and in Coimbatore, makes it evident that the danger of another widespread outbreak is by no means past. The disease continues to confine itself to the poorer classes, e.g., chucklers and coolies, and the greatest difficulty the Public Health Department has to cope with is the negligence of all concerned in failing to notify first attacks. The disease has, moreover, gradually become more and more mild, and for that reason does not now attract the same attention as it did in 1925 when 85 per cent. of those attacked died.

Veneral Diseases.—The delegation from the British Social Hygiene Council visited Madras from the 10th to 24th December. A long programme had been arranged prior to its arrival and the delegates were fully occupied. Dr. Lees gave lectures and demonstrations to large and interested medical audiences, whilst Mrs. Neville Rolfe devoted her time to social workers and to the staffs and pupils of colleges and secondary schools. It is hoped that as a result of this visit greater attention will be paid to personal hygiene, and clean living, but it must be remembered that in India many urgent problems relating to other and more dangerous diseases await solution and demand financial aid both from Government and local bodies.

Hookworm.—The International Health Board continued its health campaign in the Presidency during the year, Dr. J. F. Kendrick, its local representative, returning from leave in America. Having devoted over five years to investigation and educational work in connection with hookworm infection and soil pollution, it was decided to make a determined effort to give practical effect to the campaign in one or more local areas. With the offer of Rs. 25,000 from the Madura District Board this was made easy, and, during the last few months, a number of latrines of different types have been constructed in the Usilampatti Union of that district. The Assistant Director of the Ankylostomiasis Campaign has remained in the Union for the past three months, carrying out a vigorous propaganda campaign, and doing his best to teach the people the advantages of using these sanitary conveniences. The experiment has not been carried on sufficiently long to enable one to decide if further expansion in other villages is yet desirable, but there is reason to believe that the scheme will be successful. Certain difficulties have been met with,—both as to type of latrine and as to maintenance—but these have been now largely overcome, and it has been decided to extend the experiment to further villages in the same area. The Government has asked certain other District Boards to make similar efforts, but it is not likely that any great extension of this scheme for the improvement of rural sanitation will develop until the Public Health Department is in a position definitely to promise success. Meantime, that promise cannot be given.

The visit of the Royal Commission on Agriculture gave an opportunity of drawing attention to the importance of public health in any schemes suggested for improving the condition of rural populations in India. Not only were general health conditions touched upon in the memorandum presented, but special emphasis was given to the questions of nutrition and deficiency diseases and to the importance of having a Nutritional Institute for the Presidency. Probably, in no other Province in India is the need for such an institute more urgent, Col. MacCarrison's work having indicated only too clearly the importance of a continuation of the investigations he has been carrying out in Coonoor and elsewhere.

Adulteration of Food Act (1918).—This Act was passed as long ago as 1918, but was not brought into use because of the lack of standards. In 1923, a Public Analyst was appointed and during the last two years he has been engaged in preparing standards for milk, cream, butter and milk products generally. His report has now been accepted by Government, and the Madras City Corporation have been asked to accept the standards laid down and to introduce the working of the

Act as soon as possible. There is no doubt that an Act of this kind is urgently required, especially in municipal areas, and it is to be hoped that *mofussil* towns will seize the opportunity to prevent the gross adulterations which now take place.

National Health and Baby Week 1926.—The Health and Baby Week of 1926 was the third of its kind to be held in this Presidency. In practically every town of any size, the Week was celebrated with considerable success. Owing to epidemics of cholera seven districts were compelled to postpone the event and in three it had to be cancelled altogether. With these exceptions, however, the movement was carried through with great enthusiasm and with the whole-hearted support of the entire population, and large numbers of people were given the opportunity of understanding the principles of healthy living.

The Week was observed in 6,437 centres, 21,500 lectures including magic lantern lectures being delivered on health subjects. No less than 1,789 Baby Shows were held. A sum of Rs. 1,15,243 was collected from local bodies and by public subscriptions.

Handsome challenge trophies are awarded to the district, the union and the municipality respectively which conduct the most successful celebrations.

Madras Health Council.—The Madras Health Council is a non-official body, aided by Government and the Indian Red Cross Society, which was brought into being in April 1923 through the efforts of Her Excellency Lady Willingdon. Whilst one of the most characteristic developments of preventive medicine in modern times is the inception of well-organised measures for educating the public on matters relating to health, this work in Madras Presidency passed through various crises, the organizations responsible being more or less unsuited for that work. It was felt that any agency for health propaganda work should have at its disposal skilled assistance and also the full co-operation of the Public Health Department. The technical committee of the Madras Health Council provides both, as it includes representatives not only of the Medical, Public Health and Educational Departments of Government, but the press, the Indian Red Cross Society, the Boy Scouts and the Girl Guides Associations, etc., are also represented. The activities of the Madras Health Council include the preparation and supply to local bodies and Health Officers of (a) leaflets on the preventable diseases—3,000,000 leaflets on 12 subjects being issued in English and vernaculars during 1925-26, (b) posters—plain and coloured, on the infectious diseases, flies, lice, etc., in English and the vernaculars—90,000 posters on 8 subjects being distributed during the year, and (c) lantern slides on health subjects—2,786 new lantern slides being prepared during the year. In addition to the above, the Madras Health Council owns 14 magic lanterns which are in constant demand by local bodies and Health Officers, and a cinema film on "Malaria." This film has been exhibited in a number of centres and has proved to be very popular.

As the actual work done by the Madras Health Council has for the most part fallen on the shoulders of officers of the Public Health Department, and as the demands on the Council became more and more numerous, proposals were submitted to Government for the formation of a propaganda section in the office of the Director of Public Health to be in charge of a special officer. An auxiliary committee composed of non-officials and representatives of other organizations will be formed to advise the Public Health Department. The proposed changes will it is believed, result in a desirable expansion of Health propaganda work in the Presidency.

Public Health Act.—The need for a Public Health Act embodying the various provisions relating to public health and sanitation, now scattered over a large number of enactments, has been felt for a long time, and proposals for the preparation of such an Act have been placed before Government. It is to be hoped that the

new Legislative Council will find time to pass a Public Health Act, as many of the health provisions found in the Local Boards Act, District Municipalities Act, etc., are not only obsolete but are very defective.

Burma.

Major G. G. Jolly, Director of Public Health, Burma, reviews the year as follows:—

Malaria.—Surveys were carried out during the year, the localities selected being Hsipaw, Lashio, Papun and Sahmaw (in Myitkyina District). Dr. Feegrade, assisted by Sub-Assistant Surgeon U Tin, was in charge of the operations at Hsipaw and Lashio between the 21st June, 1926 and 20th November, 1926. Assistant-Surgeon U Mg. Gale conducted the survey in Papun from the 10th September to 2nd November 1926, while the work at Sahmaw in the estates of Messrs. Finlay Fleming & Co., which lasted only for a month, could not be completed by Sub-Assistant Surgeon Banerjee as he had to proceed to India to attend the Malaria Class towards the close of September. These investigations have brought to light valuable facts regarding the distribution of *Anopheles* species in Burma and as to the actual transmitters involved in the localities examined.

Hookworm.—Dr. Chandler of the Calcutta School of Tropical Medicine and his party came over to Burma in July to investigate the prevalence and epidemiology of hookworm infection. Dr. Chandler selected the vicinities of Rangoon, Moulmein, Prome, Heho, Mandalay, Lashio and Myitkyina as representative localities. His results which should be published shortly correspond fairly closely with those obtained in the Public Health Department's investigation in Burma Jails in 1924.

Cholera.—A severe epidemic was experienced during the year and nearly 100,000 doses of cholera vaccine were distributed. A small quantity of bivalent vaccine was also obtained and sent out to certain selected Civil Surgeons for experimental purposes. The Health Officer, Rangoon, who tried kaolin was not impressed with the results obtained in acute cases. In mild cases the drug proved successful.

Small-pox.—The Vaccination Act, 1880, has been extended during the last two years to all districts of Lower Burma with the exception of Kyaukpau, Sando-way, Salween and the hill district of Arakan; also to the Shan States and the Kyaukse, Minbu and Magwe Districts of Upper Burma, making primary vaccination compulsory over the greater part of Burma. The Prohibition of Inoculation and Licensing of Vaccinators' Act was applied to almost all districts to which Vaccination Acts were not extended. It is contemplated to put on the Statute Book an enactment to enforce compulsory re-vaccination of immigrants by sea. The Act, if passed, may apply also to Rangoon and certain other municipalities which desire this measure.

Vaccine Depot.—There has been no important change introduced in the method of manufacture of vaccine at the Vaccine Depot, Meiktila, during the year, but all batches of lymph are now examined bacteriologically before issue and highly satisfactory results have been obtained recently. A full-time Director for the Vaccine Depot has been sanctioned by Government. The number of doses issued from the Depot in the year 1925-26 was 1,100,167 and the figure is increasing steadily as a result of the enforcement of the Vaccination Acts.

Leprosy.—An Inter-Departmental Leper Committee to investigate the problem of leprosy in Burma and to formulate recommendations with a view to combating the disease was formed in November 1924 and concluded its work in the first quarter of 1925. The recommendations made by this committee are being given effect to as far as possible. The desirability of establishing a leper colony for the Province is engaging the

attention of the Local Government. An Assistant Director of Public Health was deputed to Madras to visit the Lady Willingdon Leper Settlement at Chingleput.

Hygiene Institute.—The building is now completed and the institute was formally opened by His Excellency the Governor on the 14th January, 1927. It is intended to serve—

- (1) As a public health training school.
- (2) As a provincial public health laboratory.
- (3) As an institute for research in public health problems.

The institute is also intended to serve as a centre for the dissemination of health knowledge and as a meeting place for the various societies engaged in public health propaganda. The Training School for Public Health Inspectors is now conducted at the Institute.

Rangoon Water Supply.—To tide over the deficiency of water in the hot months, the Corporation has decided to sink a number of tube wells in various parts of the city. The Local Government has arranged for an investigation of the Yunzalin valley as a source of water supply for Rangoon and experts are now at work. Owing to the Rangoon water supply being threatened with cholera contamination, a chloronome belonging to the Government Public Health Department was lent to the Corporation and chlorination started. The Corporation has recently purchased and installed its own apparatus.

Child Welfare.—The activities of the Burma Branch of the Indian Red Cross Society continue to grow and during the year the Rangoon Society for the Promotion of Infant Welfare became amalgamated with the Red Cross. Twelve child welfare and similar societies are now affiliated.

General.

A paper which will make a strong appeal to all public health workers in the tropics is an address read by Dr. Andrew Balfour to the West Indies Conference, and published in the *British Medical Journal* for June 5th, p. 929, on "Why Hygiene Pays." The address will not permit of review, but the following example from others given in it may be quoted. A rubber estate in the F. M. S. was devastated by malaria. In 1911 its staff consisted of 7 unhealthy Europeans, constantly sick, given to liquor, unmarried, and taking no interest in their bungalows or gardens. Antimalarial measures were introduced, and in 1923 there were 4 healthy Europeans, three of them married and one engaged, 3 healthy children, comfortable bungalows, pretty gardens, no drinking, and no absences on account of sick leave. In 1911 there were 870 coolies with practically no dependents. They were miserable, crawling wrecks with narrow shoulders and prominent bellies. They possessed no live stock, and no children were born alive on the garden. In 1923 there were only 450 coolies on the estate, but they were doing thrice the work accomplished in 1911, their dependents were represented by 220 healthy adults and children. They were fat, well living, and clean. They had fine gardens, over sixty head of cattle, hundreds of goats, and thousands of chickens. In 1911 one-third to one-half of the coolies had to abandon work in the middle of the day on account of fever, and complete their tasks in the evening; in 1923 a coolie was never taken off his work during the day and never had to return to finish it in the evening. In 1911 a gang was told off to dig graves, but could not dig enough for requirements; in 1923 the estate had become one of the cheapest and most efficient rubber estates in the F. M. S. from the point of view of production.

A similar story, on a less intensive scale, is recorded by B. C. Mukharji in our issue for October. Prior to

1920 there was no health officer for Khulna district in Bengal, when one was appointed, together with the necessary staff. Between 1920 and 1925 the number of deaths from cholera in the district was reduced from 4,020 per annum to 550 per annum, the tables for before and after showing the most striking differences; the total number of deaths had dropped from 48,233 to 34,437 per annum—despite an ever growing population; whilst the incidence of small-pox dropped from 1.23 per mille to 0.58 per mille. Hygiene pays, despite the cost of the measures introduced. What we should now aim at is to reduce the cost of proposed measures but to increase their efficiency, whilst propaganda needs to be ceaselessly waged. In such propaganda work the use of the "Baby Cinema" is especially advocated by Lieut.-Col. A. W. Tuke; whilst the publication of a small manual for public health workers in the tropics at a cheap cost by J. L. Das (reviewed on p. 412 of our issue for last August) will further help matters.

The obverse to this picture is presented by Dr. J. K. Datta in his review of the state of health of students at the Calcutta University. No less than 71 per cent. of the students examined were found to be suffering from physical defects, nearly all of which are preventible. Ear, nose and throat diseases loom large in the picture, and it is clear that drastic measures for reform are necessary. It is less easy to suggest what such measures should be in a city which consists in an extraordinary mixture of palaces and slums, of wide open spaces and incredibly congested alleyways. But the Calcutta Improvement Trust are at least contributing splendidly towards the reformation of the city.

Turning to water-supplies, Lieut.-Col. J. Cunningham and T. N. S. Raghvachari deal with recent methods of differentiating lactose-fermenting organisms as applied to Indian conditions. They find that slow sand filtration is the most effective method of purification from these organisms, but that the excessive pollution with animal excrement which is almost universally found under Indian conditions obscures the main issue to a great extent. If this be excluded, the findings are in general comparable with similar findings in other parts of the world. The second author deals further with the applicability of Koser's citrate utilization test to sanitary water analysis in India, as a means of differentiating faecal from soil pollution of waters with lactose-fermentors. A special medium is given for differential culture, and standards for purity suggested. The subject, however, needs further study.

J. L. Das deals with the trenching of night-soil, with special reference to conditions present in the Cossipore-Chitpore municipal area near Calcutta, population about 50,000, area available for trenching approximately 9 acres. He concludes that the soil does not appear to become "sewage-sick" by frequent trenching, e.g., once in six months, and that such repeated trenching does not exercise any deleterious effect on the soil, as its effects are quickly dealt with by nitrifying organisms.

Rabies.

A feature of the year is the output of fairly numerous papers published in connection with rabies, indicative of certain problems which have arisen in connection with the newly-introduced customs of distributing antirabic carbolised vaccine from Pasteur Institutes to district and station headquarter hospitals. The following notes are chiefly from data kindly supplied by Lieut. E. C. R. Fox, I.M.D., Superintendent, Pasteur Institute, Bengal.

The reports of the different Pasteur institutes published during the year deal with the numbers treated in 1925. The total treated shows an increase in spite of, and possibly due to, the opening of the new centres.

It is well known that a big proportion of people bitten by rabid animals still do not come for treatment. The Director of the Pasteur Institute, Coonoor, calculating from the incidence of hydrophobia among the untreated in the Madras Presidency, arrives at the conclusion that probably only one out of every six persons bitten received antirabic treatment in that province during the last twelve years.

The only method to improve this state of affairs is to get the vaccine to the patient, or as near him as possible, by opening as many treatment centres as possible and issuing the vaccine to these centres from a central institute. Madras and Bombay have been doing this for the past four years. Experimental evidence as to the effect of heat on the potency of carbolised antirabic vaccine has hitherto however been lacking. This has now been supplied. The experiments were conducted at the Pasteur Institutes at Kasauli and Rangoon, and the results published in the *Indian Journal of Medical Research* for April, p. 825, by Lieut.-Col. T. H. Gloster and Major J. Taylor arrive at the following conclusion; "Carbolised antirabic vaccine retains a high degree of immunising power for a period of two months from date of manufacture, no difference being found in its protecting value whether kept in cold storage or at the shade temperature of Rangoon with a monthly mean temperature varying from 86.2°F. to 87.4°F., and a maximum day temperature of 99.7°F."

Major W. D. H. Stevenson, Major H. H. King, Assistant Surgeon M. J. Nicholas, and Sub-Assistant Surgeon B. N. Lahiri, from Kasauli state; "So far as experiments recorded go, the evidence is distinctly in favour of there being no appreciable difference in the antigenic power between unheated vaccine and vaccine exposed to moderate heat—100°F. to 105°F.—for three to four days." Of the two reports, one deals with the temperatures likely to be met with in sending vaccine by post or by rail, the other with the storage conditions met with in Burma.

Lieut.-Col. J. W. Cornwall and Assistant Surgeon W. A. Beer deal with the neuro-paralytic accidents which sometimes occur in connection with antirabic treatment. They show from experimental work on rabbits that the action of phenol renders nerve substance less toxic, which probably accounts for the absence of such paralytic accidents in India since the introduction of Semple's carbolised vaccine. Judging from reports from Europe, very large doses of nerve substance are tolerated without apparent accident when using the etherised vaccine of Remlinger. This was experimentally confirmed by work on rabbits by Col. Cornwall and Assistant Surgeon W. A. Beer, published during the year. Lieut.-Col. J. Cunningham, Assistant Surgeon M. J. Nicholas, and Sub-Assistant Surgeon B. N. Lahiri published the first section of a report dealing with the value of an etherised vaccine, such as is used at some of the Central European institutes. Death or very marked attenuation of the rabies virus occurs in brains exposed to ether for 36 hours or longer; a few strains will survive up to 84 hours immersion, but none for longer than that period. Death of the virus occurs in spinal cords exposed to ether vapour for 7 hours; but the protective action of etherised nerve substance was not much in evidence.

Col. Cornwall and Assistant Surgeon Beer suggest a very ingenious method for the assessment of the infectivity of rabies fixed-virus by means of albino rats; their reason for this investigation being that it is desirable to have methods of comparing the properties of different strains of fixed-virus in use in different parts of the world, so that their suitability for the preparation of antirabic vaccine may be judged. The same authors also investigated the rate of multiplication of fixed-virus in rabbits; they find that if consecutive sub-passages be always made from rabbits killed on the 3rd day after inoculation, the virus dies out at the second sub-passage, but if the sub-passages be made from

rabbits killed on the 4th day, the series can be continued indefinitely; in other words 0.01 gm. of fixed-virus brain from a 4-day rabbit is an invariably lethal dose.

OBSTETRICS, GYNÆCOLOGY, INFANT WELFARE.

Dr. Margaret Balfour, W.M.S., writes:—

"The special article contributed by Major V. B. Green-Armytage in the February 1926 issue of the *Indian Medical Gazette* gives an excellent review of modern advances in obstetrics and gynæcology. He emphasises the importance of antenatal work and especially the ensuring of a suitable diet for pregnant women with due regard to vitamins. He speaks of the importance of detecting and treating such diseases as hyperemesis, malaria, and the anæmia of pregnancy and gives the latest views as regards eclampsia, osteomalacia and puerperal sepsis. Under the heading of gynæcology the causes and treatment of sterility are described and such diseases as fibroids, misplacements, etc., touched on. The article in the November issue by the same author on sterility gives a series of 300 consecutive cases, in which the husband was found to be at fault in 21.3 per cent. and the wife in 47 per cent. while in 166 per cent. no satisfactory cause could be detected in either. Rubin's insufflation test is described and Remington Hobb's method of treatment, which is also said to be valuable for puerperal sepsis.

A paper on malarial infection in late pregnancy by Blacklock and Gordon was reviewed in the January issue. This paper describes the frequency of malarial infection in the placenta in women in childbirth in Sierra Leone, namely, 36 per cent. of all cases. Comparatively few of these cases shewed parasites in the peripheral blood. The child was seldom infected with malaria but frequently died *in utero*, perhaps from malnutrition or toxæmia. These facts are of great interest and importance in connection with the high early infant mortality in India.

A reference is made to Dr. Kathleen Vaughan's paper on osteomalacia in Kashmir published in the *British Medical Journal* of March 6th. Nearly all Kashmiri women are affected with the disease with the exception of those of the *manji* class (boatmen) who live in the open air, work hard and whose diet includes raw cucumbers and tomatoes and fresh milk from their goat or cow. Other Kashmiri women live closely confined in unhygienic houses and the worst cases are seen in the houses of the wealthy who keep their women in seclusion. Indigenous cures are three in number, namely, a local clay containing a high percentage of calcium phosphate, pills made of fish liver, rubbing the body with oil and exposing to sunlight.

At the All-India Conference of Research Workers reported in the May issue reference was made to the commencement of an enquiry under the Indian Research Fund Association on maternal morbidity and mortality in child-birth in India. The enquiry is being carried out at the Haffkine Institute, Parel. The object is to get information as to the relative frequency of the different diseases and accidents of pregnancy and labour and study the ætiology and treatment of those which are most fatal to the women and children of India.

Dr. Kewalram of Daharki, Sind describes the successful treatment of a case of tetanus following labour due to the dirty methods of an indigenous *dai*. The treatment consisted first, of daily injection of 1,500 units of antitetanic serum for 3 days, then daily hypodermic injections of 25 m. of a 25 per cent. solution of magnesium sulphate and 15 m. of a 1 per cent. solution carbolic acid for one week. Ten days after first seeing the patient another dose of 1,500 units antitetanic serum was given and thereafter the patient made an uninterrupted recovery.

Dr. Ingle of Colaba, Bombay, reports a case of puerperal sepsis treated successfully by intravenous injections of tincture of iodine.

Dr. Bharadwaj of Benares writes a short note on the ætiology and treatment of puerperal fever and describes a case of interstitial fibroid causing complete inversion of the uterus and cured by operation.

Other interesting cases contributed are one of hydrocephalic monster by Dr. Dawson of Thonize, one of impacted shoulder by Dr. Viswanathan, one of absence of the uterus by Dr. Vaidya, one of hæmaturia caused by a retroverted gravid uterus by Dr. Jamal-ud-Din, and one of hæmatoma in a case of fibroma of the cervix in advanced pregnancy."

Other interesting cases recorded are a case of twin pregnancy in a bicornuate uterus by A. E. Duraswamy, and one by Capt. H. Chand of retention of a dead fœtus in an extra-uterine gestation for five years without impairment of the mother's health. K. Ghosh records a case of placenta prævia, twins, and hydramnios associated with ante-partum hæmorrhage and marked uterine inertia.

The feeding of infants has been the subject of a number of papers during the year. Lieut.-Col. C. C. Murison is an advocate of fresh, unboiled cow's milk, given in small quantities, for infants. Major Green-Armytage advocates greater attention to the feeding of children in India, with special reference to the vitamin content of their diet. Many babies are being fed on a diet which is almost devoid of all vitamins. The same author dealt in our issue for last June with the all-important subject of the acute diarrhœa and vomiting of children—a paper which has aroused very considerable interest. He points out that these cases are nearly always due to infection with Shiga's, Flexner's or Gaertner's bacillus, but they are too acute for vaccine therapy. The promiscuous use of emetine in such cases is most harmful. Saline and alkaline treatment is strongly recommended, plenty of liquid—if necessary subcutaneously, or intraperitoneally—and no food unless rice water can be regarded as such. Later on whey or skimmed milk can be given, but sugars and fats are harmful.

The same author deals with infantile cirrhosis of the liver. It is generally agreed that improper diet plays an important part in the causation of the disease. Defective diet on the part of the mother, poor health of the mother so that her milk is deficient in vitamins, etc., the giving of milk from cows fed on a diet which is deficient in vitamins, and patent foods which over-tax the liver and pancreas are important contributory causes. In treatment one or two days of barley water or rice water only, is advocated; then skimmed milk with fruit juice. A. S. V. Iyer of Tellicherry gives notes on 59 cases of the disease. The prognosis is not unfavourable in early cases in children who are more than one year old. Only three of the patients had been breast-fed; most of them having been on a mixed diet. Starchy foods predispose to the disease, and over-feeding is an important contributory element. Fresh goat's milk with fruit juices proved the most successful line of dieting. Hydrag. c. creta in doses of from $\frac{1}{4}$ to $\frac{1}{2}$ grains was the best drug, whilst castor oil should be given once a week. Treatment should be continued for from three to eighteen months if necessary.

OPHTHALMOLOGY.

Major R. E. Wright of Madras again kindly contributes a review of the year.

"The chief event of the year in India has been the opening of the new Eye Hospital in Calcutta under Lieut.-Col. W. V. Coppinger on the 1st October. This has 138 beds, including 12 for European males, 12 for European females, and 4 private wards available for paying patients of any class. Quarters for the resident staff are situated on the top floor. The hospital is now working in full swing and dealing with twice as many patients as in the old building. There are three operating theatres, one on the ground floor for out-patients, one on the first floor for aseptic cases, and one on the

second floor for septic cases. There is a low voltage electric circuit available for use with the various instruments requiring it; the pressure on the main of 220 volts being reduced to 20 volts by a Crypto-transformer.

Dr. A. H. Driver reports removal of the lenses in a case of bilateral dislocation. On one side cataractous changes had set in and total luxation had supervened on the ectopia lentis. This is liable to happen spontaneously in congenital dislocation. The lenses were, as might be expected, smaller than normal.

K. V. Israin records two cases of expulsive hæmorrhage following intracapsular extraction. In each case both eyes were operated upon at one time. In view of the possibility of serious accidents this is a procedure which many operators avoid. Expulsive hæmorrhage is perhaps less common with the capsulotomy operation, but it may occur in the most carefully selected eyes without any warning.

A. R. Harigopal describes a case of night blindness in a boy of six, in which cure followed the passage of a large number of round worms. He has seen other similar cases.

Dr. Harbans Singh publishes a case of eserine poisoning in an adult Mohammedan who was observing the fast of the Ramzan. The patient suffered from severe collapse after two instillations of $\frac{1}{2}$ per cent. eserine sulphate. As the author observes, eserine poisoning is rare in ophthalmic practice.

Capt. Cruickshank records in detail a case of lacerated wound of the eye in which the inferior rectus was torn. At first there was an upward deviation of 7 P.D. and a lateral deviation of 4 P.D. The case was treated after an interval by suture of the torn muscle, and recession of the superior rectus, followed by exercises. The result was wonderfully good. He questions the advisability of delay in suturing a torn muscle and in future would unite the ends as soon as possible after the injury. Last year the writer had to deal with a torn inferior rectus. The muscle ends, connective tissue, and conjunctiva were all carefully sutured a day after the injury with good result.

Dr. Narayana Rao reports a curious preliminary treatment for cataract couching. The coucher places a cotton suture in the bulbar conjunctiva, leaving the ends long. After a few days, during which drops are put in the eye, the operation is undertaken. The author surmises that this procedure is calculated to enhance the prestige of the subsequent operation. It certainly increases the risk of introducing infective material into the globe.

Attention is drawn to the use of the steam cautery for general purposes in the current topics of the *Gazette*. It may be noted that this is a very useful type of apparatus when adapted for ophthalmic work. It gives excellent results with early hypopyon ulcer. A thermophore is however more convenient and may perhaps be as useful.

Capt. Cruickshank contributes a stimulating article on the important subject of iritis following cataract extraction. He draws attention to the fact that iritis is frequently associated with lens cortex, capsule, or blood in the anterior chamber. Mention is also made of keratitis and iritis following the entry of antiseptics through the wound. He refers to some of the important work in support of the conception that lens matter may act as a toxin to which some individuals are hypersensitive. He gives an analysis of 82 cases of iritis following cataract extraction. In this series 23 per cent. are put down to endogenous infections or direct infections at the time of operation, 25.6 per cent. were associated with retention of the capsule and cortex, and 18.2 per cent. with blood in the anterior chamber. Capt. Cruickshank concludes from his analysis that blood or lens matter, more especially

capsule, are not mere associations with post-operative iritis, but the actual cause of it in a high percentage of cases. It is difficult to draw accurate conclusions from a small series of figures and to this the author refers. There are also in the writer's opinion other sources of error in interpreting the interesting material presented. One may be alluded to. It is impossible to exclude overlapping of the various factors associated with the iritis. It must be assumed for example that capsule retention is unassociated with cortex or infection. This alone appears to obscure the issue.

The Eye Tests Sub-Committee of the Railway Chief Medical Officers' Conference held an important meeting in Madras during September 1926, which the writer was privileged to attend. The present regulations with regard to standards of vision for the Indian railways are unsatisfactory. The Sub-Committee went thoroughly into the whole matter and after careful consideration of the methods adopted in India and in other parts of the world drew up proposals for standardising and improving the tests for visual acuity and colour vision. The proposals when adopted will constitute a great advance in sight testing regulations for the railways.

The care of the blind is a problem which has not attracted sufficient attention in India. The Blind School in Palamcottah which deals with about 150 inmates under the charge of G. Speight, is probably the only up-to-date teaching centre in the peninsula. Mr. Speight, formerly of St. Dunstan's, who himself lost his sight in the war, has introduced modern ideas extensively. Children are taken in and educated, trained to be independent, and receive industrial instruction which fits them for work in the factory connected with the institution, or enables them to do something for themselves outside. It is satisfactory to note that the Bishop of Madras has interested himself in a movement to enquire into the possibility of establishing in Madras an industrial educational centre of a similar nature, but on a large scale. The proposal has the support of His Excellency the Governor. It is to be hoped that the public will give their support when definite proposals are put forward and that the parent institution when established may be enabled to extend branches throughout the *mofussil*, and to train teachers of the blind in the most recent methods.

Dr. A. S. Green of San Francisco visited India during the latter part of the year and demonstrated his modification of Barraquer's technique for intracapsular extraction. The foot control of Green's apparatus appears to be a great advantage. His method of delivering the lens by combined Barraquer-Smith procedure is very attractive. The writer had the privilege of observing Dr. Green's technique, and considers it a sound intra-capsular procedure associated with very little trauma.

In the report of the Government Ophthalmic Hospital, Madras, published by Major Wright, attention is drawn to the influence of conditions such as quiet uveitis on the results of cataract operations. Of 1,200 cases specially examined, 180 showed evidence of uveitis prior to or at the time of operation. Other conditions which may possibly influence the incidence of post-operative inflammation are cited such as hypermaturity with degenerate lens matter, albuminuria, glycosuria, anæmias of unknown origin, syphilis and leprosy. It is pointed out that experimental work on the bacteriology of endocular inflammations has not been carried out on a sufficiently extensive scale to allow us to regard many supposed sources of infections as proven. The author proposed to conduct a research in connection with endocular inflammations. (This work is now in progress.)

The cataract work showed results very similar to those of previous years. An important innovation was

the introduction of blocking of the facial nerve at the stylo-mastoid foramen. This measure has been adopted as a routine for troublesome patients. The author has dealt fully with this subject in a separate paper. He considers that this is a very valuable procedure especially to the occasional operator.

As in previous years, trephining is the operation of choice for glaucoma. One hundred and twelve cases are recorded. The author lays stress on the importance of the role played by the vitreous in glaucoma. 'On the assumption that the vitreous under certain abnormal conditions may change its volume so as to increase the capacity of the posterior segment at the expense of the anterior segment, it is extremely important to find out how the glaucomatous vitreous differs from the normal, chemically and physically.' In co-operation with Major Newcomb, a comparative study was made of the crystalloids in normal and glaucomatous eyes. Twenty-two cases of advanced primary glaucoma were investigated. Major Newcomb sums up the results by stating, that 'although in a few cases that figures for glaucomatous vitreous show variations from the normal, in most cases the variations are within the experimental error. This, we think, negatives the idea that the glaucoma was due to a general increase in osmotic pressure within the eyeball, but does not dispose of the theory that it is due to a swelling of the colloids, due in its turn to an increased adsorption of salts and increased osmotic pressure of these in the interstices of the colloid mesh-work.' As far as the work goes, the crystalloid content of the glaucomatous vitreous does not appear to play an important part in glaucoma, but the investigation does not touch the important question of the behaviour of the vitreous as a gel. The author does not suggest that increased volume of the vitreous is anything more than one feature of the glaucomatous picture, but regards the part played by the vitreous body as of considerable importance.

Twenty cases of hæmorrhage of young people (Eale's disease) are recorded. There did not appear to be a frequent association of either syphilis or tuberculosis with the condition.

Polyvalent high titre serum (anti-pneumococcus) prepared at the King Institute, Guindy, from organisms isolated from cases of ulcer serpens during the preceding year was tried in similar cases during the year under report. Instillations of the serum did not appear to have any beneficial action. Milk injections gave more hopeful results.

The author investigated two cases of granuloma of the orbit due to an *Aspergillus*. Owing to the difficulty of staining by ordinary methods, the fungus was detected in sections only after prolonged investigation. Pure cultures were obtained. The author's observations were confirmed by Lieut.-Col. Cornwall. The condition is probably very rare, only one similar case having so far been discovered in the literature. X-rays had a beneficial action in one case. Potassium iodide did not influence the condition. These cases form the subject of a separate publication which will shortly appear.

Other conditions dealt with are macular keratitis as observed with the corneal microscope, unusual cases of herpes ophthalmicus, cystic epithelioma (a rare type), a plastic operation for lid defects, osteoma of the frontal sinus with involvement of the orbit, and large fronto-ethmoidal mucocele.

Major Strother Smith contributes a note on "a few don'ts in ophthalmic work." He emphasizes the necessity of special training and practical experience before undertaking cataract work. The inadvisability of a general anæsthetic in cataract operations on the adult and the evils of unnecessary or meddling interference with the patient beforehand are dealt with. The disadvantages of operating on a cataract in one eye while there is still good vision in the other are pointed out. He draws attention to the absence of pain in chronic glaucoma and the mistake this may lead to unless other

important signs are observed, and insists on the operative treatment of this condition. A warning is issued against overdoing the treatment of chronic trachoma with strong remedies and suggestions given for dealing with this condition.

PHARMACOLOGY.

Major R. N. Chopra, Professor of Pharmacology, Calcutta School of Tropical Medicine, kindly contributes the following review.

As a result of the treatment of malaria with alkaloids of cinchona and as an outcome of the report of Balfour-James-Dale-Acton Committee, it was concluded that quinine is an old and tried remedy giving results unequalled by any other drug. The cheap cinchona alkaloids (cinchona febrifuge), though varying in composition, are not behind any other anti-malarial drug in their potency against malarial parasite.

A. C. Roy describes a method of estimation of minute quantities of quinine in the blood. An acidified N/100 iodine-solution with 1 in 100,000 solution of quinine in a saturated ammonium sulphate solution between ranges of 0.045 mgm. to 0.001 mgm. in 5 c.c. gave excellent results in detecting a difference of 0.002 mgms., and less easily 0.001 mgm. between concentrations of 0.045 mgm. to 0.03 mgm. in 5 c.c., and with very great sharpness a difference of 0.001 mgm. between 0.03 mgm. to 0.001 mgm. in 5 c.c.

A case of poisoning by *Clitoria ternata*, the root of which was taken with cocoanut milk was reported by Sundar Ranjan. The symptoms produced were unconsciousness with irritability, retention of visceral reflexes, and loss of memory for about a fortnight; recovery occurred after stimulants. Capt. D. R. Thomas describes a case of fatal poisoning with nitrobenzene in an old man with habitual constipation who took what he thought to be almond oil in milk to relieve the constipation. Very soon after he showed signs of muscular weakness and paralysis, had intermittent pulse, quick respiration, an anxious look, inability to speak, tympanitic abdomen, cyanosis and incontinence of urine. Major R. N. Chopra and P. De show that *Digitalis purpurea* leaf of good quality grows in the valley of Kashmir and at Mungpoo near Darjeeling and that there is future for this leaf. The leaf grown in the Nilgiri Hills is not so good when biologically assayed, but they recommend thorough clinical trials before it can be finally condemned. The negative effect on the mammalian heart under experimental conditions may be overshadowed by the muscle poison effect and this may not occur when the drug is given by the mouth. They recommend improvements in methods of drying and storage to get a good and uniform quality of leaf. Major Chopra and N. Ghosh show that some medicinal plants growing in the Himalayas are well up to the standard of the *British Pharmacopœia*. *Artemisia maritima* grows abundantly in Kashmir and yields as much as 1 to 2 per cent. of active santonin; the root and leaves of *Atropa belladonna* yield more alkaloid than the standard laid down in the B.P. (0.81 per cent. against 0.45 per cent.); *Hyoscyamus niger* grows in large quantities, but its alkaloidal content is half that of the official variety; good quality of valerian grows in Kashmir; *Podophyllum emodi* with a resin content of 10 to 12 per cent. against 4 per cent. of the official American variety abounds in the shady temperate forests of the Himalayas. The same workers have already pointed out that rapid deterioration occurs in the digitalis preparations in the tropics. They studied the tincture known as "Digifortis" which is 50 per cent. above the ordinary B.P. strength; they find that it is amply potent if used within the dates stated on the phial label. In a paper on the biological assay of digitalis preparations in the tropics, Major Chopra and P. De found that the "frog method" was unsuitable for this country. They introduced a modification of Hatcher and Brodie's "cat method" which gives a very good idea as to the therapeutic potency of a tincture. Chopra also describes

the pharmacological action of some organic antimony derivatives. A number of organic compounds, including sodium antimony tartrate, urea stibamine (two brands), stibosan (von Heyden 471), von Heyden 693, amino-stiburea, stibamine glucoside, novo-stiburea, etc., were tested. They all had a more or less depressing effect on the heart, circulation and respiration, produced a fall in systemic blood pressure whilst the pulmonary blood pressure rose. The spleen volume was markedly increased; the volumes of intestine, kidney and limbs decreased. Major Knowles in an editorial in the *Indian Medical Gazette* states the present position of the remedies used in this country against amoebic dysentery. Though emetine is of undoubted value in the treatment of acute amoebic dysentery, its mode of attack on *E. histolytica* is still unsettled, nor are the hypodermic injections alone sufficient to sterilize the intestine of *E. histolytica*. The remedies recently introduced like stovarsol, etc., do not seem to be as efficient as emetine. Extract of kurchi bark and the alkaloid "conessine" seem to cure the symptoms of amoebic dysentery, though they take a much longer time. Chopra, Bose and Ghosh, investigated "Silajit," a well known remedy in the Hindu medicine. It is an excrescence obtained from certain rocks and contains, besides gums, albuminoids, traces of resin and fatty acids, a large quantity of benzoic and hippuric acid and their salts. The active substances from the medicinal point of view seem to be benzoic acid and benzoates. The drug has no effect on either the blood sugar content or the urine sugar in diabetes. Chandler and Chopra tried the effects of the administration of sugar, magnesium sulphate, sodium citrate and dilute acids on the damage done to the liver by carbon tetrachloride. Sugar administered before or with CCl₄ does not seem to reduce the toxicity as evidenced by experiments on cats and dogs. Avoidance of starvation or a fat diet during its administration, and encouragement of a carbohydrate and protein diet is sufficient. Administration of sodium bicarbonate with CCl₄ by increasing the alkalinity of the intestines would tend to reduce the amount of absorption and lessen the danger in its use. Magnesium sulphate by hastening the passage of the drug through the gut would certainly lower the amount of absorption. Acids (dilute) facilitate absorption and tend to increase toxicity. Father Caius and Dr. Mhaskar have been carrying on work on the indigenous drugs at the Haffkine Institute, Parel. Their paper giving the results of their observations on *Holarrhena anti-dysenterica* is in press. They find that the anti-dysenteric value of this drug compares favourably with that of any of the medicines in vogue. They consider it is a safe, cheap, reliable, and easily administered drug for treatment of diarrhoeic trouble. *Wrightia tinctoria* is markedly inferior in these respects. A number of other drugs including *Gymnema silvestris*, *Butea frondosa*, etc., are under investigation but the results are not yet published. Major Acton has an interesting article on cures, real and doubtful. He shows that a real fall has taken place in the death rate from liver abscess since the introduction of emetine, while no serious fall has taken place in the mortalities from snake-bite and hydrophobia. This paper should be read by all those who are inclined to generalise from insufficient data.

HELMINTHOLOGY.

Dr. A. C. Chandler has been engaged on a general hookworm survey of India, his line of work being to take selected places in the different Provinces typical of the area concerned, and investigate the defecation habits of the population, as well as the intestinal helminths present. In Eastern Bengal there is a transition from the primitive use of branches of trees in the south to bamboo-constructed latrines in the north. Latrines are chiefly used by the women and children, and to a far less extent by the men. The hookworm incidence in the latrine belt is from 60 to 65 per cent. and outside it higher—up to 98 per cent. in some areas;

but infestation is not heavy. *Ascaris* infections prevail in direct proportion to the extent of fecal pollution of tanks from which drinking water is drawn. In villages in the plains of Bengal the general incidence is about 80 per cent. but the infestation very light. In the Darjeeling Hills conditions are different; here hookworm infestation is apt to be heavy. Type of soil has a marked effect on the amount of soil infestation, heavy clay soils and very light sandy soils where desiccation is a factor being unfavourable. The lightness of infection in the plains of Bengal is largely due to the effect of the four to six months hot weather. In Assam hookworm infection is in general much more severe than in Bengal. No latrine system prevails, except among the Manipuris; soil pollution is widespread and conditions are favourable for heavy and effective soil infestation. The ground is continuously moist from the beginning of April to the end of June, temperatures are lower than in Bengal, and everything combines to spread infection. *Ascaris* and *Trichuris* infections are extremely common, *Trichostrongylus* infection also, whilst *Hymenolepis nana* was found amongst the Manipuris, and *Fasciolopsis buski* infections amongst the Manipuris and Nagas. The remedy for Assam is the introduction of primitive types of latrines, though little or nothing appears possible in connection with the Nagas.

In the tea estates of Assam and Bengal the incidence of hookworm infection among the coolies is in general considerably greater than that among the rural population, the Darjeeling district showing the heaviest returns. Some 30 per cent. of the European staff on these estates are also infected. Defecation occurs in any convenient site, less usually in the tea itself, whilst such latrines as there are tend to become fouled. *Ascaris* and *Trichuris* infections range from 68 to 88 per cent. and *Trichostrongylus* infections are also common. Hookworm infection—an almost negligible problem in the rural areas of Bengal—becomes an important one in the tea gardens of Bengal and Assam.

In the Asansol mining area conditions are again different. Soil infestation is practically entirely checked for six months of the year by the hot weather, and the degree of infestation amongst the villagers is light. In the mines galleries, especially such as are at the sides of streams, are used as defecation sites, and conditions are exceptionally favourable for soil infestation, with high humidity and high temperature. Here, however, the interesting fact emerges that the stools are eaten up within 24 hours as a rule by cockroaches; hookworm eggs will not survive the grinding of the powerful chitinous organs in the proventriculus of the cockroach; the infestation is actually less among underground workers than amongst those who work on the surface, and in this instance the cockroach is the friend of man. Dr. Chandler advocates trapping mice in these galleries, since they tend to keep the cockroach down.

Dr. Chandler's general hookworm survey of India is being continued, and its results already are of very great interest. The main fact seems to emerge that hookworm infection—as distinguished from hookworm disease—is not of very great importance in India, except in certain well defined areas and industries, where it becomes a public health problem of considerable importance.

Dr. Vishnu Korke has also carried out hookworm surveys, in Singhbhum and Bihar. In Singhbhum infection is widespread and the prevalent species is *Necator americanus*. In Puri and Cuttack the incidence of infection ranges from 55 to 72 per cent., whilst *Strongyloides* infection varies from 12 to 26 per cent. In the convict population in Bihar infection is very prevalent, but the prevailing species is *Ancylostoma duodenale*, the percentages of infection ranging from 22 to 62 per cent. Heat has a marked influence on the movements of the metamorphosed larvae of both *A. duodenale* and *N. americanus* in water.

From the Haffkine Institute, Bombay, Dr. K. S. Mhaskar records the examination of 2,791 prisoners in the Bombay Presidency. Hookworm infection was found present in 43 per cent, *Ascaris* in 31 per cent., *Trichuris* in 66 per cent. The period July to September is that when hookworm infestation is at its maximum. Major G. Covell, working at Dehra Dun, finds hookworm infection to be twice as common among Gurkha sepoys as among R. A. gunners and drivers recruited in the Punjab. A hookworm survey of Indian troops is suggested. By way of treatment beta naphthol would be the most suitable drug, and treatment should be given two months after the end of the rains, and repeated before the next monsoon's onset.

Dr. A. C. Chandler further contributes a series of papers dealing with the biological problems of hookworm infection. He comes to the conclusion that there is little evidence that light infections cause deterioration of health, but agrees with other workers that heavy infections cause serious disease. In general in Bengal not more than 10 per cent. of persons infected give egg counts of over 1,000 eggs per gramme of faeces, and this may be considered negligible in view of the fact that West African negroes showing counts of 10,000 eggs per gramme do not suffer from any symptoms due to the infection. In the absence of re-infection hookworm infection dies out at the rate of loss of 50 per cent. in three months, 60 per cent. in six months, 70 per cent. in a year, and 80 per cent. in two years. The study of the effect of acidity of the soil on the development of hookworm larvae is complicated by many other factors, such as humus content, mineral constituents, and available food material, whilst in nature the action of dung beetles in thoroughly mixing the faeces with the soil has to be considered.

Dr. Chandler further comments on human fluke infections in India. *Fasciolopsis buski* and *Gastrodiscus hominis* infections are quite common in pigs in Bengal, and he describes a new schistosome of man, *Schistosoma incognitum*—the ova having been found in the faeces of one patient from Krishnagar, and of another from Kalimpong. New Heterakidae from Indian Galliform birds which died at the Zoological Gardens, Alipore, are also described.

A. R. Harigopal records a case in which santonin administration not only cleared a boy aged 6 years of *Ascaris* infection, but also cured the night-blindness from which he was suffering. H. B. D. Nanhorya records a case of acute intestinal obstruction in a boy 3 years of age from *Ascaris* infection; at operation a tightly coiled mass of 37 roundworms was found blocking the ileum and was removed. The child subsequently passed 43 further worms under santonin treatment and made a complete recovery.

MEDICAL ENTOMOLOGY.

Dr. C. Strickland, Professor of Medical Entomology, Calcutta School of Tropical Medicine, kindly contributes the following review.

The surgeon would doubtless wish us to review the above subject from the angle of the regional relationships involved, the physician from that of systemic pathology, the public-health worker from its repercussions on all the elements of his craft. In view of the diversity—and perhaps it is lucky we have nothing to do with the obstetrician—there is nothing for it then but to discuss the matter from the systematic point of view. But before doing so it is necessary to state that the merest mention of papers on any subject will be attempted, this with a view to economy of space. Should any further information be desired, the reviewer will be glad to forward references.

Phylum—*Calenterata*—Allnutt has reported an extraordinary syndrome following the sting of a giant *physalia* ("Portuguese man-of-war").

Phylum *Appendiculata* (Lankester), Class *Chaetopoda* (leeches, etc.) P. N. Mitra has reported the passage of a leech up the urethra into the bladder of a boy. Bloody urine was drawn by catheter, and after the bladder had been irrigated for 3 days with salines and adrenalin the dead leech was painfully passed.

Class "Myriapods" (millipedes and centipedes). Houdemer from Tonkin has observed one of these creatures which possessed a phosphorescent secretion with vesicant properties.

Class *Arachnida* (spiders, ticks, scorpions, etc.). Order *Solifuga* (the jerry-munglums of Madras). One species of jerry-munglum in Morocco has been the subject of investigation by Plancenaï with regard to its venomous properties. It was acquitted of the charge and is as guiltless as its Madras relations.

Order *Acarina* (mites and ticks). L. E. Robinson's paper on the Ambloymmata has appeared in Nuttall and Warburton's *Monograph of the Ticks* and is the last word as a work of reference on this genus. Several of the "seed" ticks which habitually attack man in India are of this genus in the immature stages. Hindle and Duncan have investigated the viability of bacteria in the tick *Argas persicus*. Although they found that many of the bacteria survive for a long period in the tick, it is a striking fact that the tick's gut is usually free of these organisms. Bacterial transmission through a tick is not likely as the tick does not defæcate during its feed on man, but after it has come off him. Helwig has investigated cases of supposed pulmonary tuberculosis in monkeys and found they were due to the mite *Pneumonyssus* sp. infesting the lungs.

Class *Hexapoda* (Insects).

Order *Coleoptera* (beetles). Mills during the year has reported the case of a boy who had been "bitten" by a "beetle" and suffered from intense priapism. The reviewer on a recent visit to Assam recalls in this connection a similar case of which he was told by the local medical officer.

Order *Hymenoptera* (bees and wasps). In a woman with an idiosyncrasy to bee stings which she happened to be prone to, Brain tried desensitisation by placing diluted venom and finally the pure venom on abraded parts of the skin, the results being good.

Order *Anopleura* (lice). Juillet and Diacono have described a preparation of soap and pyrethrum powder which was an excellent pediculicide.

Order *Hemiptera* (bugs). De Bergevin has collated the literature on the bugs which may occasionally bite man.

Order *Siphonaptera* (fleas). Mordil points out as a matter of historical interest that ancient Peruvian water jars depict cases of infestation of the feet by the jigger-flea.

Order *Diptera* (flies).

Family *Psychodidae* (owl-midges, sandflies in India).

McCombie Young, Richmond and Brendish have investigated the breeding grounds of *Phlebotomus papatasi* in the Peshawar and Landi Kotal areas and observed the habits of the adult fly. As a result of their work they think the best means of dealing with the sandfly fever trouble is to make pucca the ground surrounding lines, repellants and traps being of but little use.

Sinton has described a new species of Indian *Phlebotomus* from Kasauli, *P. newsteadi*.

Family *Culicidae* (mosquitoes). Edwards and James have written of the control of British mosquitoes, and their paper should be consulted from the Indian point of view.

Sub-family *Culicinae*. Barraud has continued his survey of the *Culicines* of India. Siler, Hall and Hitchens obtained 47 out of 111 positive transmissions

of dengue with *Stegomyia fasciata*, failing completely in 7 *Culex fatigans* experiments. The patients were infective to mosquitoes only for the first three days of their illness and the incubation in the insect was about 11 days. (Chandler has replied to this, stating that he obtained infective mosquitoes after 24 hours). The mosquitoes once infective were always infective, but the "virus" was not passed on to their offspring. The incubation period in man was 4 to 10 days.

Sub-family *Anophelinae*. With regard to the carriers of malaria, Boserup in the Netherlands Indies, whence so many similar reports have come, has noted an epidemic of malaria apparently due to *A. kochi*; 86.6 per cent., of which could be experimentally infected. (This compares in an extraordinary way with Barber's experiments in the F.M.S. on the same lines when *kochi* was found not to be infectible and with the Indian observations of about 10 per cent. infectibility rate in such powerful carriers as *funestus*, *culicifacies* and *maculatus*.)

Gill has considered from every point of view the question of *rossi* (Giles) being a carrier. He could infect it experimentally with *P. vivax*, but as its prevalence is not correlated with the Punjab epidemic season it is doubtful even now whether it is an important factor. Rodenwaldt and Essed on the other hand in the Dutch East Indies consider that *rossi* is an important carrier, and Rodenwaldt in the Celebes is of the same opinion.

The conditions of carriage of the malaria parasite are now looming up more largely, stimulated by the facilities for experiments afforded by the infected-mosquito treatment of insanity. James has contributed a valuable paper in this regard, and Yorke and Wright for instance have found that successive passages direct from man to man (up to 53 as far as they have gone) over 3½ years did not prevent the parasite from losing its infectivity to mosquitoes: 19 out of 23 experiments were successful; (but compare Barzildai's work, reviewed last year).

Christophers and Sinton have compiled a malaria map shewing the main features of malaria distribution in the Indian Empire. From the point of view of preventive measures Le Prince is now recommending the systematic destruction of gorged anophelines in malaria-stricken houses. This could be of but limited application in India, but in certain places such as plantations it ought certainly to be carried out. Swellengrebel and Roubaud are at theoretical variance over the use of animals as deflectors of anophelines. Hacker has composed a thesis on the mechanism of destruction of larvæ by means of oil. In the effort to devise other means of mosquito control, a large amount of refined observations are now being made on the biology of mosquito larvæ, and it is to be hoped that these may ultimately lead to as refined antimalarial operations; such work for instance has been done by Senior-White, largely investigating the pH. of surface waters. Boral who found that water containers painted white repel mosquitoes from laying their eggs in them, Iyengar who noted the catholic tastes of a *stephensi* at Bangalore, and Barber and Hayne who have made a survey of water collections which were occupied by the water hyacinth. The latter point out that it is not certain whether the hyacinth is beneficial or the reverse; all Bengalis, especially the politicians, should read this paper.

Family *Muscidae*, etc. (house flies). Sutton has described a case of myiasis of the temporal bone, which was nearly completely destroyed, the *dura mater* being exposed: the site of the infestation apparently was an old discharging sinus behind the ear. Other interesting cases of myiasis reported during the year have been by Franchine, of the intestine (by *Fannia* sp.) with dysenteric symptoms; by Jewett of the middle ear, the parasite being removed after the instillation of 2 minims of chloroform, and of the eye by *Oestrus ovis*.

Mr. R. Senior-White, Malaria Research Officer, Central Malaria Bureau, Government of India, Kasauli, kindly contributes the following notes.

The incrimination of *Phlebotomus argentipes* as the carrier of Kala-azar, will next necessitate an intensive study of the systematics and distribution of the genus *Phlebotomus*, as well as an enquiry into the carrying capacity of the remaining species of the genus in the Indian sub-region, before the extremely difficult entomological problem of control can be taken up. In comparison with the last, mosquito control will be child's play.

In regard to malaria, "Physical Factors in Mosquito Ecology," (Senior-White, *Bull. Entom. Res.*, xvi, 187-248), carries the search for the reasons underlying mosquito distribution a considerable step forward, though it also shows that such are far more recondite and complex than the original studies of hydrogen-ion concentration and mosquito distribution at first led workers to imagine.

A very pretty piece of ecological investigation is "The Anopheline Fauna of a Swamp in Bangalore," (Iyengar, *Ind. J. Med. Res.*, xiii, 697-702), in which a single water system is studied from its seepage origin to its swamp ending, and the restricted water-requirements of the various species of Anophelines found are shown and illustrated by excellent photographs. It is just such a small but varied water-system as that dealt with which will repay intensive chemical and other studies in connection with distribution in space and time.

The danger of inexpert interference with water, especially in areas where *A. maculatus* is concerned, is again proved by a short paper by Mitra, (*Ind. Med. Gaz.*, lxi, 112).

A small book *Mosquito Reduction and Malarial Prevention*, by Crawford and Challam, originating from Bombay, gives an elementary account of the subject suited to the layman, and has already been reviewed in the *Indian Medical Gazette*.

Jepson, (*Bulletin 74, Ceylon, Department of Agriculture*), has settled once and for all the problem of the origin of the fly nuisance that follows heavy manuring on plantations, the species concerned in his experiments being *Musca nebulosa* and *M. yerburyi*, on the life histories of which many valuable data have been accumulated during the enquiry, which shows that the trouble does not originate until the manures become damp, and is therefore unavoidable as soon as they are applied to the soil. The manufacturers and the railways are cleared of responsibility for the nuisance.

In pure dipterology of medical importance the following papers may be mentioned, though not all of them are of Indian origin, as is unavoidable in dealing with this branch of the subject:—

Malloch, *Ann. Mag. Nat. Hist.*, xvii, (9), 489; "Exotic Muscaridæ, part xviii." contains notes on many Oriental species, with numerous new species of medical interest.

Schmitz, *Naturhist. Maandblad*, xv, (8), 92,— "Anatomy of the Phoridae."

Senior-White, *Rec. Ind. Mus.*, xxviii, 127,— "Revision of the Oriental Caliphorinæ."

Sinton, *Ind. J. Med. Res.*, xiii, 559,— "*Phlebotomus newsteadii*, sp. nov."

Lieut.-Col. S. R. Christophers describes a new species of mosquito—*Anopheles pattoni*—from North China.

Major G. G. Jolly describes a most interesting and unorthodox experiment in East Africa during the war in jigger-flea control. The site of a camp was heavily infested with jigger-fleas, and all attempts to control the menace by the usual means failed. The policy was then adopted of letting the troops and followers go about freely bare-footed, so as to act as bait to the jiggers. Each man was daily inspected and all jiggers removed and destroyed. At first the number of jiggers collected was rather amazing, but by the end of a week the numbers were rapidly diminishing, and the infection had practically ceased within a month. Dr. M. C. Lang records a case of scorpion bite in the Central Provinces in a man of 22 associated with very severe symptoms, chiefly those of shock and cyanosis. The urine was found loaded with albumin and death seemed imminent, but the patient ultimately made a complete recovery and albumin almost disappeared from the urine. Treatment was by local incision and application of tincture of ferri perchloride—(surely a hypodermic injection of novocaine and adrenalin is better)—and the administration of cardiac stimulants and subcutaneous saline infusion. Assistant Surgeon A. R. d'Abreu gives an interesting general account of the effects of bee venom; citing two cases with severe symptoms after being stung by swarms of disturbed bees, and a case where marked urticaria with severe respiratory symptoms followed a sting of a single bee which had apparently injected the venom into a superficial vein in the foot.

Major J. A. Sinton describes a simple and useful box for class demonstrations of mosquitoes and other small insects; (*Indian Journ. Med. Res.* July, p. 235).

PROTOZOOLOGY.

The year has seen a most notable event in the publication of Dr. C. M. Wenyon's sumptuous *Protozoology: A Manual for Medical Men, Veterinarians, and Zoologists* (Ballière, Tindall and Cox, London; two vols.; xxviii + 1563 pp.; profusely illustrated with both coloured and half-tone plates; price £4-4-0). This splendid work collects together the whole of the experimental and research work in medical and veterinary protozoology up to about the middle of 1926; it forms a foundation upon which the future of the science will largely be built. A copy will be required in every research laboratory in India. It was fully reviewed in our issue for November 1926, p. 569. A smaller but useful book is Craig's *Parasitic Protozoa of Man*, published during the year, and reviewed on p. 519 of our issue for October 1926. Still a third important publication in the science is Calkins' *Biology of the Protozoa*—a book full of merit, for it deals with the Protozoa from a new aspect—their physiological, and biological, as apart from their morphological, aspect. It was reviewed in our issue for December 1926, p. 631.

Of papers published in India that by Asst. Surgeon B. M. Das Gupta on *Pentatrachomonas* infection in Calcutta deserves mention. He shows that this species (or variety) is the only intestinal type of *Trichomonas* present in patients in Calcutta; its pathogenicity has still to be determined. Rai Bahadur G. C. Chatterji, H. Roy and A. N. Mitra record *Pentatrachomonas* infection of the Indian jackal, and it would be of interest to know whether this is acquired from a human source. *Trichomonas* infection of rats in India is with *Trichomonas sensu strictu*, i.e., *Tetratrachomonas*; whilst in one case of oral infection with *Trichomonas* observed in Calcutta during the year, the parasite showed four anterior flagella only, and is clearly a different species (or variety) from the intestinal one.

Major General T. H. Symons gives a complete and interesting account of piroplasmiasis in the hounds of the Madras pack, detailing clinical symptoms, with temperature charts, treatment, and prophylactic measures; (*Indian Journ. Med. Res.* October, p. 293). M. A. N. Rau describes successful experimental infection of the Indian jackal with *Babesia canis*—a finding

in direct contrast with that of Nuttall and Graham-Smith in 1909, who were unable to transmit dog piroplasmiasis to jackals.

It may be said that the medical schools of India are beginning to wake up to the importance of protozoology in tropical medicine. There have been many and notable pioneers in this science in olden days in India; Timothy Lewis, D. D. Cunningham, Evans—who first discovered the trypanosome of surra, in the Punjab, and Sir Ronald Ross, to name but four. It is important that the medical man in the tropics shall be able to recognise malaria parasites, *Entamoeba histolytica* in its different phases, the parasites of kala-azar and oriental sore, and the different intestinal protozoa under the microscope; but this fact is only now becoming generally recognised. One may say in general that in the study of parasitic diseases four different phases in the history of medicine may be recognised. The first is the clinical period, prior to the discovery of the parasitic cause; here clinical observation has to be very exact and accurate and it is not likely that the world will again see such brilliant clinicians as Sydenham and his contemporaries. The second opens with the discovery of the parasitic agent; attention now tends to be centred on the laboratory rather than clinical observation—though the laboratory ought never to be allowed to overshadow the clinician. The third is the recognition that the soil is of equal importance with the seed; that disease in the human subject depends upon the interplay of many biological and biochemical factors, all of which demand study; hence the rise into prominence within recent years of biochemistry in medicine. The fourth—as Sir Ronald Ross has long preached—is the necessity of supplementing qualitative observation with quantitative and numerical and statistical observations; thus it may be necessary not only to know that a person is infected with malaria; it may be important to know *how much* malaria he has got; this may affect not only the prognosis for the individual himself, but also the degree of his infectivity—*via* the mosquito—to others.

SEROLOGY AND IMMUNOLOGY.

Major R. B. Lloyd, Professor of Serology, Calcutta School of Tropical Medicine, kindly contributes the following notes:—

"Variation in micro-organisms.—The question as to whether the serological characters of a micro-organism are fixed or mutable, or if the latter to what extent, is now attracting much attention. The question is one of fundamental importance. It has also direct practical bearings, for it will be recollected that the ultimate test for a micro-organism of the typhoid type is its serological reaction. Mellon and Jost describe two strains of typhoid organisms both isolated from the same patient who was dangerously ill with typhoid, one from the blood and the other from the stool. Both grew on plain neutralised agar in fine transparent streptococcus-like colonies. Microscopically they were both unusually short, and both were entirely non-agglutinable by a standard antityphoid serum. Transplantation of these coccus-like non-agglutinable strains on 0.1% cystine agar produced luxuriant growth of organisms which were motile and completely agglutinable. When the culture was again transferred to agar containing no added sulphur compounds, the strains again became non-agglutinable. This is an example of a purely metabolic change affecting all the organisms in the culture.

They also describe hereditary changes involving the strain resulting in the dissociation of a permanent type with the characteristics of the cystine agar colonies. Only in certain organisms of the culture does this variation occur, but when it occurs the new type breeds true.

Tomb and Maitra working in Bengal find that sporadic cholera, which is clinically indistinguishable from epidemic cholera, is associated with non-agglutinating types of vibrio, which differ from the true

Koch's vibrio only in the serological reaction. Chronic carriers of agglutinating vibrios are not found. By a new method of isolation and cultivation, they have found that in the endemic area of Bengal up to 35% of the inhabitants may harbour non-agglutinating forms. The presence of an agglutinating type of vibrio is not essential for the symptom-complex of cholera, but it is essential for the spread of the disease in epidemic form. Tomb and Maitra believe they have converted the agglutinating vibrios into the non-agglutinating forms. This claim will necessarily rest on the obtaining of the agglutinating form in 'pure culture' at the commencement of the experiment. Attempts to convert the non-agglutinators into agglutinating forms were inconclusive. Their conception that outbreaks of epidemic cholera are due to the mutation of non-agglutinating forms derived from carriers into agglutinating forms is of great interest.

The remarkable observations of Cunningham on relapsing fever in Madras also bear on this question of mutation. Briefly, he finds in experimental infections in squirrels that the spirochaetes present in a first attack are not the same serologically as those of the relapse. If a second relapse occurs, No. 1 serological type of spirochaete reappears. In the third relapse, i.e., fourth attack of fever, No. 2 type reappears. The distinction is sharp, no trace of any group reaction being detected. The serological types are permanent, and remain unchanged on continued subpassage, as long as the subpassage is made during the first attack. Once a relapse has supervened the type changes. Professor Ledingham's note on Cunningham's results is as follows:—'The paper raises the question whether, and to what extent, certain variation phenomena in bacteria, involving loss of serological specificity, which have been studied of recent years in the laboratory, are paralleled in the living body. The data available so far are too meagre to permit any definite conclusion to be drawn. All that can be said is that phenomena of this kind are now being looked for in actual bacterial disease. We are fortunate therefore in having this elaborate investigation to ponder over in the light of the laboratory data which have accumulated vastly of recent years. I do not think the time has yet arrived when we can explain with satisfaction the interactions between parasite and host, but there is no doubt that mutation of bacteria, as now studied in the laboratory, is going to throw a flood of light on the immunological responses observed in the infected patient.'

Blood grouping tests.*—The chief feature of interest of the year in my own department is the large number of blood compatibility tests performed in connexion with blood transfusion, which is now making rapid strides in Calcutta. Recent work has made it clear that grouping of the recipient and donor by stock grouping sera is not by itself sufficient, as cases are occasionally met with where bloods which are of the same group are not entirely compatible (abnormal types). It is always desirable to supplement the grouping results by direct matching tests between the bloods of the recipient and the proposed donor. Our method is as follows:—Blood is drawn from the vein of the recipient, and the first few drops are ejected into 1 c.c. of salt solution. (Unless some time is to elapse before the tests are done, citrate is unnecessary.) This provides a suspension of the recipient's cells. The remainder of the blood is allowed to coagulate, and the serum of the recipient is thus obtained. The recipient is then grouped, and a donor of the same group obtained. Blood is similarly drawn from the vein of the donor, the first few drops being ejected into salt solution to obtain a suspension of his cells. The remainder of the donor's blood is allowed to coagulate, and the resulting serum is divided into three parts. One part is used for grouping tests, the second for the Wassermann reaction, and the third replenishes the stock of grouping sera. Direct matching tests are then doubly done, i.e., cells of recipient

against serum of donor, and cells of donor against serum of recipient. If both these tests are negative for agglutination, the two bloods are compatible.

Lists of healthy previously grouped donors are maintained in my laboratory, and a blood transfusion service has in this way been introduced.

It is not however always possible in an emergency to carry out the complete tests detailed above, and the various procedures which may be adopted are in order of merit as follows:—

(a) As stated above, the best technique is to group both donor and recipient. Choose a donor of the same group as the recipient, and confirm both the correctness of the grouping and the absence of abnormal type by direct matching tests.

(b) If method (a) be not possible, it is best to take a universal donor and check by direct matching.

(c) If neither of these methods be possible, it is justifiable to depend on a direct matching test alone. In such a case it should always be done doubly, i.e. patient's serum against donor's cells and vice versa.

(d) The least satisfactory method is the use of a universal donor without a matching test. This should never be resorted to if it can possibly be avoided.

Blood transfusion in Calcutta has almost invariably been carried out by the citrate method (sodium citrate 1 gram, distilled water 50 c.c. to 450 c.c. of blood), and the results are extremely satisfactory.

Wassermann reaction.—Increasing experience with modern techniques points clearly to the conclusion that only treponematoses diseases, i.e., syphilis and yaws, yield the positive Wassermann reaction. Our own results have shown that malaria may be excluded, as may also leprosy (Kolmer) (Pineda and Roxas-Pineda) (Lloyd, Muir and Mitra). That leprosy does not, apart from co-existing syphilis or yaws, yield a positive Wassermann reaction may, I believe, be accepted as a settled fact. Upon this conclusion the treatment depends; for in our experience the detection and removal by suitable treatment of the associated syphilis is an indispensable condition for the proper response by the leper to antileprotic treatment.

Flocculation reactions in syphilis.—There is now a consensus of opinion that the most generally useful of these is the reaction of Kahn. This is comparatively simple to perform, though accurate titrations of the antigen are required, and it is never likely to become a bedside procedure. Little is gained, we think, by the quantitative expression of the results. Results with this test agree fairly well with those of the Wassermann reaction, but we should not at present be prepared to place reliance on it alone in the diagnosis of syphilis. The Kahn reaction has in India a wide field of usefulness in the detection of associated syphilis in leprosy for the reasons given above, being more simple to perform than the Wassermann test, and therefore more applicable to outstation work.

Aldehyde test for kala-azar.—Extensive use of the aldehyde reaction by Napier has shown that the test is extremely trustworthy, and may be relied on for the diagnosis of a well-established case, thus obviating the necessity for splenic puncture. Apart from the possible danger of this operation, the immense saving of time is very valuable in routine work. It is necessary still to emphasise the fact that the positive reaction consists in the formation of an opacity, not merely in gel formation which occurs in many conditions.

Blood tests for parentage.—Largely as the result of the work of Ottenberg, who deduced the inheritance of blood groups on the basis of two independent pairs of Mendelian unit factors, it has hitherto been accepted that:—

(a) Unions of groups I and I, I and II, I and III, I and IV, II and III parents may produce offspring of any group.

* (Note:—In the discussion of blood groups the Moss terminology is employed throughout.)

(b) Unions of groups II and II, or II and IV can only produce offspring of groups II or IV.

(c) Unions of groups III and III, or III and IV can only produce offspring of groups III or IV.

(d) Unions of groups IV and IV can only produce offspring of group IV.

Very recent work by Bernstein and by Furuhashi which has been confirmed by Snyder has shown that blood groups are inherited as a series of three multiple allelomorphs. Three factors, one recessive (R) and two dominants (A) and (B), are considered to be the basis of the four blood groups.

Thus group IV (Moss) has the genetic formula RR.

Thus group II (Moss) has the genetic formula AA or AR.

Thus group III (Moss) has the genetic formula BB or BR.

Thus group I (Moss) has the genetic formula AB.

It follows from this that a group I parent can never have a group IV child. Conclusions (b), (c) and (d) of the above formula of Ottenberg remain unchanged, but according to the new results conclusion (a) requires modification.

Conclusion (a) now reads as follows:—

Unions of groups I and I, I and II, or I and III may have offspring of groups I, II, or III (but no IV).

Unions of groups II and III may have offspring of any group.

Unions of groups I and IV can only produce offspring of groups II or III.

These new results shew that the blood grouping tests for parentage have an even closer application than was formerly thought."

A very interesting article is that by Major Lloyd on the serological analysis of blood-stains in criminal cases (*Indian Med. Gaz.*, May, p. 219). In identification the presence of blood, and not of some other matter simulating blood, must first be established. Then the precipitin test for proteid of a particular species must be applied. Illustrative cases are given in connection with cases of murder and culpable homicide, rape, theft and house-breaking, and animal wounding. Even horse meat substituted for beef may be recognised by such methods.

DERMATOLOGY.

Only a few papers call for comment. Major H. W. Acton concludes that prickly heat is due to a staphylococcal infection of the mouths of the sodden sweat ducts during the hot weather and rains. These staphylococci may be derived from the skin, but are more usually derived from a seborrhoea of the scalp, strewn all over the body by the agency of towels and clothes. Clothing—especially for Europeans—in the tropics should be made to conform to the climatic necessities; and a formula is given for a dusting powder which has very beneficial results (*Indian Med. Gaz.*, July, p. 321). Lieut.-Col. F. J. Palmer, R.A.M.C. (retd.), records a case of cure of Madura foot by intravenous injections of 3 grains of bismuth sodium tartrate on four occasions at intervals of one to two weeks; followed by 1½ grain doses of copper citrate intravenously at intervals of two weeks; and by two further injections of bismuth sodium tartrate. Assistant Surgeon H. N. Bagchi discusses the treatment of tropical ulcer. Scraping under an anæsthetic and cauterising with pure carbolic acid—the surrounding parts being protected with gauze soaked in alcohol—followed by dressing with sterile vaseline, appeared to give the best results.

LABORATORY METHODS, VACCINES, ETC.

Capt. K. R. K. Iyengar continues the studies of methods of vaccine preparation, etc., originally insti-

tuted by Colonel W. F. Harvey and himself in previous years, working chiefly with *B. avisepticus* as a test organism. He finds that heating to 40°C to 60°C for half an hour, with subsequent addition of 0.5 per cent. phenol is as efficient in sterilisation as sterilisation by adding carbolic acid only; on the other hand heating to 80°C definitely deteriorates the power of the vaccine. There is no direct correlation between agglutinins and protective power. The virulence of the fowl cholera strain used could not be enhanced except by animal sub-passage, and this may apply to other bacteria also. With regard to the immunity conferred by vaccines prepared by different methods, vaccines killed by heat at 40°C to 60°C with the subsequent addition of 0.5 per cent. phenol were as efficient as vaccines killed by the addition of phenol at room temperature. Vaccines heated to 80°C had a very low immunising value.

Lieut.-Col. J. W. Cornwall has investigated the variation in the amount of soluble protein contained in old broth cultures of *B. typhosus*. This rises to a maximum after 7 to 12 weeks of incubation and then falls again. This protein is derived from the solution of parts of the bodies of dead bacilli, and owing to local variations in the concentration of nutrition in a broth culture some bacilli are constantly dying whilst others are continually reproducing; local conditions thus varying. The same author records the recovery of *B. typhosus* from the gall-bladder and liver of an apparently healthy rabbit given an intravenous injection of living typhoid bacilli 2½ years previously. The same author with Assistant Surgeon W. A. Beer has investigated the mode of cessation of multiplication of *B. typhosus* in broth culture. The factors concerned in such cessation of growth are not exhaustion of the germ plasm by repeated reproduction, nor overcrowding, nor lack of nutriment; and if dying off of the culture be due to accumulation of some metabolite in the culture, then this substance is not heat-labile.

From the Haffkine Institute, Bombay, Lieut.-Col. F. P. Mackie reports that extensive studies of the bacteriophage of d'Herelle have been carried out under Professor d'Herelle himself—who was on a visit from Europe; but the results are not yet ready for publication.

SERVICE NOTES.

Col. J. K. S. Fleming, Deputy Director-General, I.M.S., kindly sends the following notes.

In the Service Notes forwarded in December 1925, it was stated in regard to the reconstitution of the Indian Medical Service that in so far as the future employment of officers in Civil, etc., was concerned, it was being considered in consultation with the Local Governments and orders in connection therewith would be issued in the near future. Replies from all Local Governments have now been received and the Government of India in a despatch to the Secretary of State in July 1926, submitted final proposals which are at present under consideration.

No orders have yet been issued on the Memorials (referred to in paragraph 3 of Service Notes of December 1925), submitted by the Indian members of the Service whose commissions were dated prior to 1st December 1925, in regard to the free passage concession to Europe and back.

Under A.I.I. No. B-115 of 4th May 1926, Administrative Officers of the Indian Medical Service count their service for additional pension from the date of promotion to fill an existing vacancy in the rank of Colonel or Major-General. This applies retrospectively to Administrative Medical Officers now serving in the Indian Medical Service.

The sanction of the Secretary of State has also been accorded in Army Instruction (India), No. B-309,

dated the 2nd November 1926, to the following revised scales of additional pensions for Administrative Medical Officers of the Indian Medical Service.

Major-General after	Per annum.
	£
(a) 3 years active service as such	.. 350
(b) 2 " " " "	.. 315
(c) 1 " " " "	.. 285
Colonel after	Per annum.
	£
(a) 4 years active service as such	.. 250
(b) 3 " " " "	.. 185
(c) 2 " " " "	.. 125
(d) 1 year " " " "	.. 65

The question of the grant of revised rates of disability pensions is at present under consideration of the Government of India and orders thereon are expected in the near future.

Under the revised study leave rules for the Indian Medical Service a study allowance at 12s. a day in the United Kingdom, £1 a day on the continent of Europe and £1-10 in the United States of America is admissible to officers during the course of their studies. Leave combined with study leave in excess of one year up to 28 months is now also admissible to them.

It is proposed to hold a Congress of the Far Eastern Association of Tropical Medicine in Calcutta in December 1927 and arrangements in connection therewith are now in train.

Dr. W. S. Carter, Acting Principal, Peking Union Medical College, visited the medical colleges and schools and medical research institutes in this country on behalf of the Division of Medical Education of the Rockefeller Foundation.

Colonel R. A. Needham, C.I.E., D.S.O., M.D., I.M.S., is again on a tour of inspection of the medical colleges as Inspector of Medical Education on behalf of the General Medical Council.

Twelve European officers have recently been admitted into the Service and one will be admitted in February 1927 after attendance at the course at Millbank in accordance with the Special Recruitment terms of 1926, which have already appeared in the press. These terms are as follows:—

A gratuity of £1,000 after six years service, or £2,500 after twelve years service, together with free return passage to any officer so appointed who no longer desires to remain in the Service, subject to 12 months notice of his intention being given. Five Indian candidates have also been recruited.

The present strength of the Indian Medical Service is:—

Permanent Officers—European	..	..	495
" " Indian	..	..	152
Temporary Officers—European	..	..	5
" " Indian	..	..	130

CASUALTIES.

Died.

Lieutenant-Colonel W. J. Fraser.

Lieutenant-Colonel M. F. White.

" A. Chalmers.

" R. A. Chambers.

Retired.

Major-General Sir R. Charles MacWatt, Kt., C.I.E., etc.

Colonel T. B. Kelly.

" E. F. E. Baines.

" J. H. McDonald.

Lieutenant-Colonel J. H. Hugo.

" H. M. Brown.

" R. M. Dalziel.

" W. Gillitt.

" W. M. Pearson.

" R. P. Wilson.

" W. J. Collinson.

" W. H. Tucker.

" H. R. Brown.

" P. K. Chitale.

" J. W. Cornwall.

" F. S. C. Thompson.

" J. L. Marjoribanks.

" R. F. Standage.

" G. E. Stewart.

" G. McPherson.

" A. J. V. Betts.

" A. W. Tuke.

" E. C. G. Maddock.

" W. S. J. Shaw.

" E. F. G. Tucker.

" D. McCay.

Major R. B. Nicholson.

" W. L. Forsyth.

" J. G. B. Shand.

* * * * *

The reviewer cannot conclude this somewhat lengthy review of an interesting year of progress in tropical medicine and allied sciences in India during 1926 without again thanking the many who have contributed to it. In connection with the proposed review of 1927 he would beg that those who may be interested will very kindly send in notes for inclusion in the review—to reach him at the Calcutta School of Tropical Medicine, not later than January 10th, 1928. There may be many to whom he has not personally appealed for information, but who would like to contribute brief notes. This annual review may be of importance from two different aspects; in the first place it may present to the medical profession in India a review of the progress made during the year in the form of a symposium written by several leading authorities on the different subjects concerned; in the second, it may be of value in spreading abroad in other countries a knowledge of what is being done in India.

R. KNOWLES.

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